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Los Angeles, Calif.

Printed in U. S. A.

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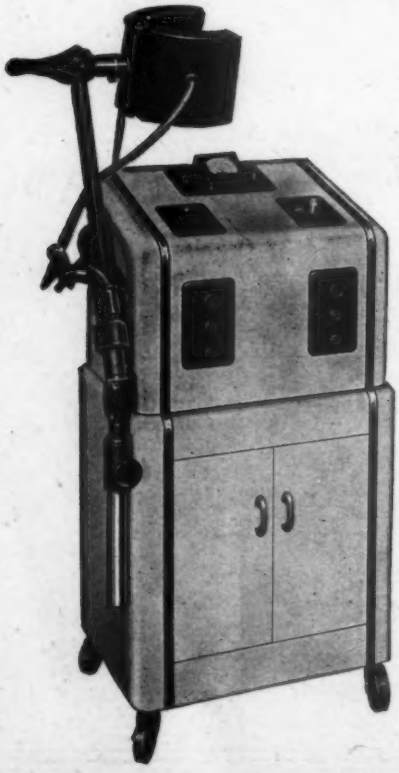

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OBSERVATIONS ON MUSCLE SPASM IN POLIOMYELITIS *

Electromyographic Studies on the Effect of Various Forms of Thermal Therapy and of Prostigmine §

ARTHUR L. WATKINS, M.D.

and

MARY A. B. BRAZIER, Ph.D.

BOSTON

The widespread hypersensitivity or "spasm" of muscles during the acute stage of poliomyelitis has been emphasized recently as one of the most characteristic findings in this disease. For some years a major aspect of treatment has been the attempted relief of this symptom, and for this purpose elaborate physical therapeutic methods requiring constant attention of trained personnel have been used. It thus seems of considerable practical, as well as theoretical, importance to determine the comparative effectiveness of these methods in reducing muscle spasm.

In previous reports[1] from this laboratory quantitative methods have been described for measuring the degree of spasm by the voltage of the electrical potentials discharged by the muscles on passive stretching. This method has been standardized in the present study in order to evaluate the comparative effects of hot packs, radiant heat and diathermy. In view of the recent reports of Kabat and Knapp[2] on prostigmine in the relief of spasm, use of this drug was included among the treatments studied.

This preliminary report is restricted to one aspect of the effect of treatment, namely, the influences of single applications of a therapeutic agent on muscle spasm during the first weeks of the disease. This is a portion of a longer study now in progress which is concerned with the total course of the disease, including the nature of the recovery process. Since all the patients were in the early infectious stage, studies were restricted to adult patients readily accessible in the isolation ward. Six such patients were available for study, and each received intensive tests during the acute stage. In all, 835 measurements were made, the first test usually being done within a few days after diagnosis had been established. These patients are still under treatment and observation in the outpatient clinic, and final evaluation is not yet possible.

Methods

The degree of muscle spasm was measured by the response of the muscle to passive stretching, and the technic of stretching was standardized to make it comparable from test to test. The force used for stretching was constant, consisting of a known weight, and the duration of stretch was uniformly five seconds. In the upper extremity, to stretch the flexors and extensors of the wrist and elbow, the suspended weight was attached distally to the respective joint. In the lower extremities the force of the weight was appropriately directed by use of overhead pulleys. The hamstrings were stretched both by straight leg raising and by extending the knee with the hip flexed at an angle of 90 degrees.

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* From the Department of Physical Medicine and the Electromyographic Laboratory of the Massachusetts General Hospital.

§ Prostigmine used was a diagnostic ampoule supplied by Hoffmann-La Roche, Inc., containing prostigmine methylsulfate 1/40 gr. with atropine sulfate 100 gr.

This study was aided by a grant from the National Foundation for Infantile Paralysis, Inc.

1. (a) Schwab, R. S.; Watkins, A. L., and Brazier, M. A. B.: Quantitation of Muscular Function in Cases of Poliomyelitis and Other Motor Nerve Lesions, Arch. Neurol. & Psychiat. 50:538 (Nov.) 1943. (b) Watkins, A. L.; Brazier, M. A. B., and Schwab, R. S.: Concepts of Muscle Dysfunction in Poliomyelitis, Based on Electromyographic Studies, J. A. M. A. 123:188 (Sept. 25) 1943. (c) Brazier, M. A. B.; Watkins, A. L., and Schwab, R. S.: Electromyographic Studies of Muscle Dysfunction in Infectious Polyneuritis and Poliomyelitis, New England J. Med. 230:185 (Feb. 17) 1944.

2. Kabat, H., and Knapp, M. E.: Use of Prostigmine in the Treatment of Poliomyelitis, J. A. M. A. 122:989 (Aug. 7) 1943.

As mentioned, the measure used for quantitation of the degree of spasm induced by stretching was the total voltage of electrical potentials discharged by the muscle during the five-second stretch period. A normal muscle gives little or no discharge when subjected to passive stretching, but a muscle in spasm will release a continuous burst of potentials which can be recorded on the electromyograph, as shown in the accompanying illustration. The use of a calibrated integrator in circuit with the

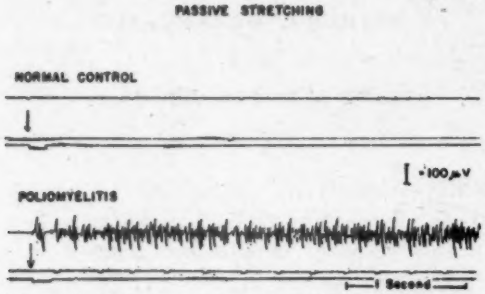

Fig. 1. — Electromyographic tracings during passive stretching or normal muscle (upper record), and partially paralyzed muscle in poliomyelitis (lower record). Voltage discharged is minimal in normal muscle as indicated by tracing and by number of integrator signals. In the case of poliomyelitis there is considerable discharge and multiple integrator signals.

electromyograph makes possible the quantitation of the voltages from the muscle. This device works on the principle of a condenser which discharges on receiving its complement of electricity, and in discharging records on the electromyographic tracing. This type of voltage integrator has been described in more detail elsewhere.[1a]

For this work the electrodes consisted of the standard type of solder disks approximately 1 cm. in diameter applied in pairs with electrode paste and adhesive tape to the skin over the body of the muscle. An additional electrode was placed on some neutral point to act as a ground.

The currents from the muscles were amplified by the standard types of power amplifier used in electroencephalographic work and were recorded by an ink-writing oscillograph.

On each test day a number of control observations were made on every muscle before the therapeutic procedures were begun. The therapeutic methods investigated were: twenty-minute applications of the Kenny type of hot packs, infra-red irradiation, luminous heat, short wave diathermy by induction technic and intramuscular injection of 1.6 mg. of neostigmine (prostigmine methylsulfate).

In the case of hot packs and diathermy the therapeutic technic necessitated the removal of the electrodes, so that these had to be reapplied to the same positions on the muscle for the post-treatment recording. In the other instances the electrodes remained in place throughout the procedure.

In every case the strength of the muscles was graded according to the standard manual examinations as described by Lovett[3] and others.

Results

Hot Packs. — The effects of twenty-minute applications of the Kenny type of hot packs have been summarized in table 1. Forty-six base line ob-

TABLE 1. — *Degree of Irritability to Passive Stretching for Five Seconds* *

Type of Therapy	No. of Muscles Tested	No. of Tests	Mean Before Therapy	Mean After Therapy	Percentage Change
1. Hot packs	10	89	1,687	1,740	3
2. Infra-red radiation	13	118	1,771	1,889	7
3. Luminous heat	18	150	1,997	1,487	—26
4. Prostigmine	18	139	1,786	1,306	—27
5. Diathermy	13	80	3,078	3,067	0

* Measurements are in microvolts.

servations were made on the passive stretching of ten different muscles before therapy, showing an average response of 1,687 microvolts per stretch period (five seconds). The tests were repeated forty-three times after therapy, with no significant change in the mean electrical discharge (1,740 microvolts).

3. Lovett, R. W.: The Treatment of Infantile Paralysis, ed. 2, Philadelphia, P. Blakiston's Son & Co., 1917.

Infra-Red Irradiation. — Sixty-one observations on the stretching of thirteen muscles were made prior to infra-red irradiation for twenty minutes, the average value being, 1,771 microvolts. There was only a neglible change after therapy, as revealed by fifty-seven readings averaging 1,889 microvolts.

Luminous Heat. — After twenty minutes of this therapy in over seventy tests the average discharge was 26 per cent less than in a similar number of base line observations, a decrease in the mean of 510 microvolts.

Diathermy. — Twenty minute applications of this therapy in forty tests caused no change in the discharge released.

Prostigmine. — Seventy tests were made before and after the intramuscular injection of 1.6 mg. of this drug. At the period of maximum effectiveness of the drug, namely, twenty minutes after the injection, there was 24 per cent less irritability than during the control period.

Comment

In table 1 the initial irritability before diathermy is seen to be considerably greater than that observed before the other methods of treatment. This may be explained by the fact that diathermy could not be given until at least eighteen days after the onset of the disease, when the patient was no longer confined to the isolation ward. Analysis of the data in table 2

TABLE 2. — *Degree of Irritability to Passive Stretching for Five Seconds* *

Strength of Muscle Tested	Days After Onset		
	1 to 8	9 to 16	17 to 30
Under 50% (120 tests on 7 muscles)	996	1,345	2,103
Over 50% (135 tests on 11 muscles)	2,166	2,293	3,075

* Measurements are in microvolts.

revealed that the muscles became increasingly irritable after the first week. The increase was twice as great in the more severely weakened muscles as in those with less than 50 per cent loss.

In this series no effort was made to study the effect of the different types of heat on the degree of spasm in those muscles which had no impairment of strength. When the effect of prostigmine was being tested, however, muscles with normal strength were used for comparison and, as in all these cases the paresis was unilateral, the corresponding muscle group in the opposite extremity was used as a control. As observed by Schwartz,[4] many muscles which show no loss in strength exhibit hyperirritability in patients with poliomyelitis. This was true in the majority of our patients, and it was found that injection of prostigmine was followed by a decrease in irritability amounting to 21 per cent. The muscles with full strength but no spasm, on the other hand, showed an increased irritability to stretching after injection of prostigmine (table 3).

It is obvious that no definite conclusion concerning the value of physical therapy or of prostigmine in the treatment of poliomyelitis should be drawn

TABLE 3. — *Effect of Intramuscular Injection of Prostigmine on Muscles of Normal Strength in Poliomyelitis* *

	No. of Muscles Tested	No. of Tests	Mean Before Therapy	Mean After Therapy	Percentage Change
100% strength with some spasm	16	112	1,822	1,432	—21
100% strength with no spasm	3	33	342	1,292	+28

* Measurements are in microvolts.

4. Schwartz, R. P., and Bouman, H. D.: Muscle Spasm in the Acute Stage of Infantile Paralysis, J. A. M. A. 119:923, 1942.

from studies of this limited scope. Observations were not made on the effects of repeated use of these agents, but only on the effect of a single application to determine whether any one agent showed a marked superiority over the others in the temporary relief of spasm. With single tests of this kind, only changes of 50 per cent or more would be convincing in so small a series, but in these 6 cases no change greater than 26 per cent was found. There was no evidence to suggest that any one method of applying heat had any specific effect on the spasm, and the same is true of prostigmine.

During the course of the present studies all patients but one were receiving the Kenny type of hot packs four to five times daily except on the day of the test. However, since no specific effect of hot packs was demonstrated, it seems justifiable to omit their routine use in the future and to study a repeated application of a single method of treatment throughout the course of the disease. This should be a more effective comparison of their relative value.

From the subjective point of view, the patients felt that the different types of heat were all moderately comforting, there being no consistent preference for one type of therapy. Patients uniformly disliked prostigmine, however, because of its effect on the gastrointestinal tract.

Several of the patients had rather severe pain in the affected extremity for the first few days. None of our methods of treatment can be said to have been outstandingly effective in relieving this, and from clinical observation alone one would conclude that the pain tended to decrease spontaneously rather than as a definite result of treatment.

The degree of muscle paralysis in these patients varied from nearly complete loss of power to barely perceptible weakness, and in every instance there was some slow but steady improvement in muscle strength during the follow up period of four to five months. It is expected that further improvement will be seen as time goes on. As an isolated observation it is interesting to note that, to date, the one patient who had no hot packs or other treatment, except that of the test and the usual muscle reeducation, has shown the same degree of improvement in muscle power as the others in the series.

As already noted, muscle irritability was observed to be of widespread distribution, occurring in muscles which were paralyzed as well as those without paralysis, and there seems to be no direct correlation between the degree of hyperirritability to stretching and the degree of paralysis. On the other hand, these quantitative studies indicated that there was less irritability in the more severely paralyzed muscles, as seen in table 2. The increase in irritability of weak muscles late in the disease may be explained by a background of spontaneous discharge in the resting muscle. This type of activity has been reported as a feature of motor neuron regeneration.[1b]

Summary

1. Muscle spasm in patients with acute poliomyelitis was measured by quantitation of the electrical discharges released on five seconds of passive stretching by known weights.

2. The effect of twenty-minute applications of hot packs, infra-red radiation, luminous heat, short wave diathermy and the intramuscular injection of prostigmine (1.6 mg.) on this electrical component of spasm was tested.

3. Single applications of hot packs, infra-red radiation and diathermy had no effect.

4. Luminous heat and prostigmine caused a decrease in spasm of approximately 25 per cent. This degree of change was not great enough to indicate a specific effect on spasm.

5. Further studies on repeated use of a single method of treatment will be necessary for final evaluation.

ARTIFICIAL FEVER-CHEMOTHERAPY *

IV. Prefever Preparation and Postfever Care

GEORGE X. SCHWEMLEIN, PASSED ASSISTANT SURGEON (R) U. S. P. H. S.
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Associate in Physical Medicine, Northwestern University Medical School
and
ROBERT M. CRAIG, PASSED ASSISTANT SURGEON (R) U. S. P. H. S.
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Physically induced therapeutic fever has been advocated by many physicians in the field of physical medicine[1] as a hospital procedure to insure the optimum of safety. The physicians and nurses in charge of the patients treated must be carefully and thoroughly trained in the procedures employed. An understanding of the physiology and biochemistry of the human body at high levels of temperature is essential if the complications which may develop during this form of therapy are to be competently managed. Potential complications may often be avoided by (1) a thorough diagnostic survey to reveal contraindications,[2] (2) adequate prefever preparation and (3) intelligent administration of fever therapy and postfever care.

The routine methods described have been developed and applied to hospitalized patients during the past two years. The fevers have been produced in air-conditioned cabinets (hypertherm).

I. Early Syphilis

Patients with early syphilis (primary, secondary and early latent) receive a single session of eight hours[3] of fever at 106.0 F. (rectal) combined with the administration of mapharsen and bismuth.[4]

A. *Prefever Routine.* — Patients are to go on the following routine by written order of the physician, indicated by a "prefever" stamp on the clinical chart. No patient is to be taken off the routine except by written order of the physician. If the bile salts and/or the sodium chloride cause gastrointestinal upsets the medications are to be administered only as tolerated and the physician is to be notified. A period of either one or two days of these medications is satisfactory. Patients are not to have fever-chemotherapy (hereafter referred to as fever therapy) except by written order of the physician.

1. The temperature and pulse rate are to be determined and recorded at 8 a. m. and 4 p. m. daily.

2. A determination of the specific gravity of the blood plasma is to be made before breakfast on the day prior to fever therapy.

3. A high vitamin, high caloric diet is to be observed, with meals three times daily. Nourishment may be offered between meals.

---

* From the Section on Fever-Chemotherapy, Chicago Intensive Treatment Center, Venereal Disease Control Program, Chicago Board of Health, in cooperation with the United States Public Health Service.

1. Krusen, F. H.: Physical Medicine, Philadelphia, W. B. Saunders Company, 1941, p. 46. Osborne, S. L., and Holmquest, H. J.: Technic of Electrotherapy, Springfield, Ill., Charles C. Thomas, 1944, p. 622. Stokes, J. H.; Bierman, H., and Ingraham, N. R.: Modern Clinical Syphilology, Philadelphia, W. B. Saunders Company, 1944, p. 351.

2. Kendell, H. W.; Craig, R. M., and Schwemlein, G. X.: Artificial Fever-Chemotherapy Contraindications, to be published.

3. This session has recently been reduced to six hours.

4. Bundesen, H. N.; Bauer, T. J., and Kendell, H. W.: The Intensive Treatment of Gonorrhea and Syphilis, J. A. M. A. 123:816 (Nov. 27) 1943.

4. Desiccated whole bile salt capsules (Armour's) are to be administered, 10 grains three times daily, after meals.

5. Two enteric-coated sodium chloride tablets are to be taken three times daily after meals (7 grains of sodium chloride with 3 grains of dextrose per tablet).

6. A low soapsuds enema is to be administered the night before fever therapy.

7. A cleansing bath is to be taken the night before fever therapy.

8. A phenobarbital tablet, 1½ grains, is to be administered at bed time the night before fever therapy.

9. Morning care is to follow the usual routine; that is, the patient is to brush his teeth and wash his hands and face.

10. Broth, crackers and coffee (without cream) and/or fruit juice are to be given between 7 and 7:30 a. m. on the morning of fever therapy.

11. The patient is to be weighed without shoes and clad only in pajamas before going to the Fever Therapy Department. One pound is to be deducted for the weight of the clothing and the net weight reported to the Fever Therapy Department.

12. The patient is to be ready for fever therapy at 8 a. m.

B. *Postfever Routine.* —

On the day of fever therapy (before midnight):

1. The pulse rate and rectal temperature are to be determined and recorded every half hour until the temperature returns to 101.0 F. and then every hour until it is 99.6 F. for three consecutive readings.

2. The blood pressure is to be determined and recorded every half hour until stabilized.

3. The pulse rate, rectal temperature and blood pressure are then to be determined and recorded every hour until midnight.

4. Cold tap water is to be given as tolerated in 1 ounce (30 cc.) amounts for the first two hours after the patient's return from fever therapy; after that hot tea, toast and water are to be given as tolerated.

5. After the rectal temperature returns to 99.6 F. the patient is to be given a cleansing bed bath by the nurse or a supervised attendant; the cotton blankets are to be removed and the gown changed.

6. Absolute bed rest is to follow. (The patient is not to be allowed to sit up or to get out of bed.)

On the first day after fever therapy (beginning after midnight):

1. The pulse rate, rectal temperature and blood pressure are to be determined and recorded every four hours from midnight to 8 a. m.

2. After 8 a. m. the rectal temperature and pulse rate are to be determined and recorded every four hours. The blood pressure is to be determined and recorded every eight hours (8 a. m., 4 p. m., midnight).

3. A test for albumin and a microscopic examination are to be made of the first morning specimen of urine.

4. The patient is to have bed rest until 4 p. m. but may go to the bathroom and examination room.

5. A cleansing bed bath is to be given.

6. Breakfast is to consist of hot cereal and fluids such as tea, coffee or milk. Lunch and dinner are to be high in calories, vitamins and fluids. Nourishment may be offered between meals.

7. Fluids may be taken orally as tolerated.

8. Milk of magnesia, 4 teaspoonfuls, is to be given at bedtime.

On the second, third and subsequent days after fever therapy:

1. The rectal temperature and pulse rate are to be determined and recorded every eight hours (8 a. m., 4 p. m., midnight).

2. The blood pressure is to be determined and recorded at 8 a. m. and 4 p. m.

3. An icterus index determination is to be made on the second day only. The patient is not to have breakfast until the laboratory work is completed.

4. A high vitamin, high caloric diet is to be observed, with meals three times daily. Nourishment may be offered between meals.

5. Two enteric-coated sodium chloride tablets are to be given three times daily after meals (7 grains of sodium chloride with 3 grains of dextrose per tablet).

6. A low soapsuds enema is to be administered if the milk of magnesia has not been effective (second day only).

C. *General Routine for All Postfever Patients.* — All patients who have received fever therapy should be given as careful observation as postoperative patients. The physician's order sheet is to be checked immediately after the patient has returned to the Postfever Therapy Department. No patient is to be taken off the postfever routine without a written order by the physician. No patient is to leave his bed if ill, i. e. to go to examination room or laboratory, without permission from the physician.

1. The patient's bed is to be prepared as follows:

(*a*) The bed is covered with a single cotton blanket. A second cotton blanket is placed on the bed with the top 6 to 8 inches from the head of the bed. The sheet and spread are added, and, finally, the blanket, sheet and spread are folded back so that the bed is in readiness to receive the patient. In warm weather adjustments of the patient's bed covering will be left to the judgment of the nurse in charge. The patient's room is to be kept comfortable and free from drafts.

(*b*) No pillow is to be used under the patient's head until the systolic blood pressure has been stabilized at a level above 90 mm. of mercury.

2. The following occurrences are to be reported to the nursing supervisor:

(*a*) Failure of the rectal temperature to become stabilized at 100.0 to 98.0 F. within three hours.

(*b*) A consecutive rise in rectal temperature of any two half-hour determinations.

(*c*) A systolic blood pressure reading below 90 mm. of mercury.

(*d*) A rectal temperature reading below 98.0 F.

(*e*) Emesis: (1) continuous nausea and vomiting immediately after treatment, (2) intermittent nausea and vomiting after three hours or (3) blood-stained emesis.

(*f*) Liquid stools.

(*g*) Any abdominal pain or discomfort.

(*h*) Inability to arouse the patient from sleep.

(*i*) Any pulse or respiratory abnormality.

(*j*) Delirium or mental disorientation.

(*k*) Anuria.

3. Six inch blocks are to be placed immediately under the foot of the bed of any patient whose systolic blood pressure goes below 90 mm. of mercury. The blocks are to be removed the following morning if the systolic blood pressure is above 100 mm. of mercury.

4. Antacid powder,[5] one teaspoonful, is to be given for nausea and vomiting.

5. Equal parts sodium bicarbonate, calcium carbonate and heavy oxide of magnesium.

5. The oral intake of fluids and the urinary output are to be accurately measured, recorded on the fluid sheets and totaled on the clinical charts. The amount of emesis is to be added to the urinary output. (Example: emesis — 100 cc., urine — 400 cc., total output — 500 cc.)

6. Two per cent procaine hydrochloride ointment is to be used for pain in the rectum.

7. One APC tablet (acetophenetidin, acetylsalicylic acid and caffeine) is to be given for postfever headache.

II. Neurosyphilis

Patients who have neurosyphilis without psychosis are treated with multiple sessions of fever.[6] These patients are given three, three hour sessions of 105.0 to 106.0 F. (rectal) on Monday, Wednesday and Friday as tolerated for a total of twelve treatments. The fever sessions are combined with administration of mapharsen, 0.06 gm. being given intravenously at the beginning of the period of maintained fever. Two cubic centimeters of bismuth subsalicylate in oil (150 mg. of elemental bismuth) are given each Tuesday, alternately in each buttock. Treament of one group of patients begins at 8:15 a. m. and of another at 1.15 p. m.

A. *Prefever Routine for Patients Receiving Treatments in the Morning.* — Patients are to go on the following routine by written order of the physician. No patient is to be taken off the routine except by written order of the physician. If the sodium chloride tablets cause gastrointestinal upsets these medications are to be administered only as tolerated and the physician is to be notified. Patients are not to have fever therapy except by written order of the physician.

On the day before fever therapy:

1. The rectal temperature and pulse rate are to be determined and recorded every eight hours (8 a. m., 4 p. m. and midnight).

2. The blood pressure is to be determined and recorded at 8 a. m. and 4 p. m.

3. A determination of the specific gravity of the blood plasma is to be made before breakfast.

4. A high vitamin, high caloric diet is to be observed, with meals three times daily. Nourishment may be offered between meals.

5. Two enteric-coated sodium chloride tablets are to be given three times daily after meals (7 grains of sodium chloride with 3 grains of dextrose per tablet).

6. A test for albumin and a microscopic examination are to be made of the first morning specimen of urine.

7. A low soapsuds enema is to be administered at 8 p. m. the night before fever therapy.

8. A cleansing bath is to be taken the night before fever therapy.

9. A phenobarbital tablet, 1½ grains, is to be taken at bedtime the night before the first fever treatment.

10. The oral intake of fluids and the urinary output are to be accurately measured, recorded on the fluid sheets and totaled on the clinical charts. The amount of emesis is to be added to the urinary output. (Example: emesis — 100 cc., urine — 400 cc., total output — 500 cc.).

On the day of fever therapy:

1. The rectal temperature, pulse rate and blood pressure are to be determined and recorded at 6 a. m.

2. Morning care is to follow the usual routine; that is, the patient is to brush his teeth and wash his hands and face.

6. Kendell, H. W.; Rose, D. L., and Simpson, W. M.: Fever Therapy Technic in Syphilis and Gonococcic Infections, Arch. Phys. Therapy 20:614 (Oct.) 1939.

3. Broth, crackers and coffee (without cream) and/or fruit juice are to be given between 7 and 7:30 a. m. the morning of fever therapy.

4. The oral intake of fluids and the urinary output are to be accurately measured, recorded on the fluid sheets and totaled on the clinical charts. The amount of emesis is to be added to the urinary output. (Example: emesis — 100 cc., urine — 400 cc., total — 500 cc.).

5. The patient is to be weighed without shoes and clad only in pajamas before going to the Fever Therapy Department. One pound is to be deducted for the weight of the clothing and the net weight reported to the Fever Therapy Department.

6. The patient is to be ready for fever therapy at 8 a. m.

B. *Postfever Routine for Patients Receiving Treatments in the Morning.* — *On the day of fever therapy* (*before midnight*):

1. The pulse rate and rectal temperature are to be determined and recorded every half hour until the temperature returns to 101.0 F., then every hour until it reaches 99.6 F., then at 4 p. m. and finally every four hours until 8 a. m.

2. The blood pressure is to be determined and recorded every half hour until stabilized and then at 4 p. m. and every four hours until 8 a. m.

3. Cold tap water is to be given as tolerated in 1 ounce (30 cc.) amounts for the first two hours after the patient's return from fever therapy; after that hot tea, toast and water are to be given as tolerated.

4. After the rectal temperature returns to 99.6 F. the patient is to be given a cleansing bed bath by the nurse or a supervised attendant; the cotton blankets are then to be removed and the gown changed.

5. The patient may be ambulatory after 5 p. m.; however, bed rest should be encouraged.

6. The patient may have hot tea and toast, bouillon and gelatin after 3 p. m. if desired.

On the first day after fever therapy (*beginning after midnight*):

1. The pulse rate and rectal temperature are to be determined and recorded every eight hours. (Omit the midnight determination if the patient is asleep.)

2. The blood pressure is to be determined and recorded at 8 a. m. and 4 p. m.

3. A test for albumin and a microscopic examination are to be made of the first specimen of urine.

4. A high vitamin, high caloric diet is to be observed, with meals three times daily. Nourishment may be offered between meals.

5. Two enteric-coated sodium chloride tablets are to be given three times daily after meals (7 grains of sodium chloride with 3 grains of dextrose per tablet).

On the second and subsequent days after fever therapy:

1. The pulse rate and rectal temperature are to be determined and recorded every eight hours. (Omit a midnight determination if the patient is asleep.)

2. The blood pressure is to be determined and recorded at 8 a. m. and 4 p. m.

3. A high vitamin, high caloric diet is to be observed, with meals three times daily. Nourishment may be offered between meals.

4. Two enteric-coated sodium chloride tablets are to be given three times daily after meals (7 grains of sodium chloride with 3 grains of dextrose per tablet).

C. *Prefever Routine for Patients Receiving Treatments in the Afternoon.* — Patients are to go on the following routine by written order of the physician. No patient is to be taken off the routine except by written order of the physician. If the sodium chloride tablets cause gastrointestinal upsets these medica-

tions are to be administered only as tolerated and the physician is to be notified. Patients are not to have fever therapy except by written order of the physician.

On the day before fever therapy:

1. The rectal temperature and pulse rate are to be determined and recorded every eight hours (8 a. m., 4 p. m., midnight).
2. The blood pressure is to be determined and recorded at 8 a. m. and 4 p. m.
3. A determination of the specific gravity of the blood plasma is to be made before breakfast.
4. A high vitamin, high caloric diet is to be observed, with meals three times daily. Nourishment may be offered between meals.
5. Two enteric-coated sodium chloride tablets are to be given three times daily after meals (7 grains of sodium chloride with 3 grains of dextrose per tablet).
6. A test for albumin and a microscopic examination are to be made of the first morning specimen of urine.
7. A cleansing bath is to be taken the night before fever therapy.
8. A phenobarbital tablet, 1½ grains, is to be taken at bedtime the night before fever therapy.
9. The oral intake of fluids and the urinary output are to be accurately measured and recorded on the fluid sheets and totaled on the clinical charts. The amount of emesis is to be added to the urine output. (Example: emesis — 100 cc., urine — 400 cc., total output — 500 cc.).

On the day of fever therapy:

1. The rectal temperature, pulse rate and blood pressure are to be determined and recorded at 8 a. m.
2. Morning care is to follow the usual routine; the patient is to brush his teeth and wash his hands and face).
3. A low soapsuds enema is to be administered at 9 a. m.
4. A high vitamin, high caloric breakfast is to be given (only fluids are to be taken after 10 a. m.).
5. The oral intake of fluids and the urinary output are to be accurately measured and recorded on the fluid sheets and totaled on the clinical charts. The amount of emesis is to be added to the urinary output. (Example: emesis — 100 cc., urine, 400 cc., total output — 500 cc.).
6. The patient is to be weighed without shoes and clad only in pajamas before going to the Fever Therapy Department. One pound is to be deducted for the weight of the clothing and the net weight reported to the Fever Therapy Department.
7. The patient is to be ready for fever therapy at 12 noon.

D. *Postfever Routine for Patients Receiving Treatments in the Afternoon.* —

On the day of fever therapy:

1. The pulse rate and rectal temperature are to be determined and recorded every half hour until the temperature is stabilized at 101.0 F., then every hour until it reaches 99.6 F. and then at 8 p. m. and every four hours until 8 a. m.
2. The blood pressure is to be determined and recorded every half hour until it is stabilized and then at 8 p. m. and every four hours until 8 a. m.
3. Cold tap water is to be given as tolerated in 1 ounce (30 cc.) amounts for the first two hours after the patient's return from fever therapy; after that, hot tea, toast and water are to be given as tolerated.
4. After the rectal temperature returns to 99.6 F. the patient is to be given a cleansing bed bath by the nurse or a supervised attendant and the cotton blankets are to be removed and the gown changed.

5. The patient may have bathroom privileges after 8 p. m.

6. The patient may have hot tea and toast, bouillon and gelatin after 8 p. m. if desired.

On the first day after fever therapy (beginning at midnight):

1. The pulse rate and rectal temperature are to be determined and recorded every eight hours. (Omit a midnight determination if the patient is asleep.)

2. The blood pressure is to be determined and recorded at 8 a. m. and 4 p. m.

3. A test for albumin and a microscopic examination are to be made of the first morning specimen of urine.

4. A high vitamin, high caloric diet is to be observed, with meals three times daily. Nourishment may be offered between meals.

5. Two enteric-coated sodium chloride tablets are to be given three times daily after meals (7 grains of sodium chloride with 3 grains dextrose per tablet).

On the second and subsequent days after fever therapy:

1. The pulse rate and rectal temperature are to be determined and recorded every eight hours. (Omit a midnight determination if the patient is asleep).

2. The blood pressure is to be determined and recorded at 8 a. m. and 4 p. m.

3. A high vitamin, high caloric diet is to be observed, with meals three times daily. Nourishment may be offered between meals.

4. Two enteric-coated sodium chloride tablets are to be given three times daily after meals (7 grains of sodium chloride with 3 grains of dextrose per tablet).

III. Gonorrhea

Patients who have gonorrhea which is resistant to sulfanilamide and its derivatives, or gonorrheal complications, receive the same prefever preparation, except for the administration of bismuth, and the same postfever care as patients with early syphilis. The fever therapy[7] consists of an eight hour session at 106.0 F. (rectal). Beginning at 12 noon the day immediately before fever, the patients receive 2 Gm. of sulfathiazole by mouth. This dose is repeated at 4 p. m., and 1 Gm. is given every four hours thereafter until a total of 8 Gm. has been administered.

Summary

Routine hospital measures are described for prefever preparation and postfever care of patients who are receiving fever therapy for early syphilis, neurosyphilis without psychosis, gonorrhea which is resistant to sulfanilamide and its derivatives and gonorrheal complications.

7. Rose, D. L.; Kendell, H. W., and Simpson, W. M.: Refractory Gonococcic Infections, War Med. 1:470 (July) 1941.

* The following collaborated in the development of the procedures described in this paper: M. C. Johnson, R. N.; C. M. Eadler, R. N.; F. B. Werner, R. N.; M. E. Basinger, R. N.; C. I. Bollinger, R. N.; P. S. Palmer, R. N.; R. R. St. Germaine, R. N.; C. F. Clark, R. N.; L. W. Buford, R. N., and M. C. Wilhelm, R. N.

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PHYSICAL MEDICINE IN THE REHABILITATION OF PATIENTS WITH WAR NEUROSES *

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The problem of rehabilitation in the wartime and postwar periods is a colossal one; in no field will it be found more gigantic and more difficult than in the treatment of the neuroses. The management of the neuroses introduces simultaneously the most intricate and yet the most optimistic problem in the entire field of psychiatry. The importance of both psychiatry and physical medicine in rehabilitation is attested by the establishment of psychiatric and physical therapy units in all emergency services of the combat zones.

It has been said[1] that a true war neurosis "is the direct reaction to war experience and therefore there are few or no factors of predisposition in its inception." The psychogenesis of war neuroses is a disputed question. Emphasis is often placed on predisposition factors and personality problems of the individual soldier as etiologic agents. It has been stated[2] that "war neuroses do not form a specialized group but are comparable to the neuroses of peacetime." Also,[3] that "neuroses incurred in war time or under combat conditions has come to be considered pre-conditioned and non-specific. There has been deemphasis of exciting cause and reemphasis of individual personality and other predisposition factors. Further,[4] that "it seems that the man who has developed a so-called 'war neurosis' was predetermined before he entered the Service. It might even be said that war neuroses are 'made in America' and only come to light or are labeled in combat." And:[1]

> With certain qualifications it may be said that the neuroses of war are the neuroses of peace. A wide range of clinical conditions has been included in the term war neuroses. In the last war the very acute and dramatic neurotic patterns were called "shell shock." In the current war the more benign term "combat fatigue" has been applied to the manifestations which appear to be a direct result of war experience.

However, Strecker[5] has pointed out that:

> The basic conflict appears to be between the instinct of self preservation and soldierly ideas and discipline, a conflict which operates unconsciously under conditions of danger and combat. A pathologic solution of this conflict takes the clinical form of one of the war neuroses. The precipitating factors are fatigue, exhaustion, unbelievable hardship, deprivation and horror. The type of neurosis is determined by the innate personality of the man who breaks.

Among war neuroses have been included such conditions as exhaustion neurosis, concussion neurosis, fright neurosis, neurocirculatory asthenia and Guadalcanal neurosis.

The development of war neuroses is inevitable. It is to be remembered[6]

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* Published with permission of the Medical Director, Veterans Administration, who assumes no responsibility for the opinions expressed or the conclusions drawn by the author.

* Read at the Twenty-Third Annual Session of the American Congress of Physical Medicine, Cleveland, Sept. 7, 1944.

1. Karnosh, Louis J.: The Neuroses of War, Cleveland Clin. Quart. 11:38 (April) 1944.
2. Minski, Louis: War Neuroses, J. Chart. Soc. Mass. & M. Gymn. 27:45 (Sept.) 1941.
3. Rosner, Albert A.: Neuropsychiatric Casualties from Guadalcanal, Am. J. M. Sc. 207:770 (June) 1944.
4. Henderson, J. L., and Moore, Merrill: The Psychoneuroses of War, New England J. Med. 230: 273 (March 9) 1944.
5. Strecker, Edward A.: Neuropsychiatry in War, Arch. Neurol. & Psychiat. 51:493 (May) 1944.
6. Stilwell, Leland E., and Schreiber, Julius: Neuropsychiatric Program for a Replacement Training Center, War Med. 3:20 (Jan.) 1943.

that "modern warfare is intense and amazingly fast. Static warfare has given way to ever moving, dynamic combat." Mechanized fighting and bombing have been become so fierce that they have approached "the final limits of man's mental endurance, and there comes a time when even the strongest man's mind will weaken."[7] It is to be stressed that the "sufferer from war shock is not a weakling; he is not a coward. He is a battle casualty."[7] Every individual has his limits of endurance, mentally as well as physically, and beyond those limits he is prone to develop a psychiatric disability.[8] Therefore, mental illness, which was so common during World War I, has become even more conspicuous during this global struggle.

The incidence of neuroses is considerable and impressive. Perhaps the greatest single casualty producer in this war is psychoneurosis. Circular Letter No. 176[9] issued by the War Department stated, "According to present figures, from 10 to 20 per cent of casualties developing in combat are neuropsychiatric and, in certain engagements, as high as 30 per cent are of this type." Regarding etiology this letter declared:

> Ordinary neuropsychiatric disorders are thought to occur only in weaklings or in individuals with personality defect. This is not true. Information at hand indicates that a significant proportion of the neuropsychiatric casualties are occurring in individuals who give no history suggesting predisposition. Under the extremes of stress and fatigue of modern combat, the most stable individual may reach his breaking point. Thus, the presence of neuropsychiatric disorder must be looked for in normal as well as predisposed individuals. The psychoneuroses comprise the vast majority of neuropsychiatric casualties in the combat zone.

Neurosis developing in military personnel was regarded as a major problem of war medicine during the first World War, and has acquired momentous military and economic significance with the continuation of this war.[10] Officers are not immune. One observer[11] found that mental disturbances occurred frequently among commissioned officers. Among the wounded the ratio of officers to enlisted men was 1 to 24; among those with war neuroses it was 1 to 6.

It has been said:[1]

> There are four general categories of neurotic illness in military personnel: (1) preexisting, peacetime neuroses which continue unchanged; (2) prewar neuroses which become markedly aggravated in wartime; (3) disorders of personality which are not serious handicaps or glaring defects in normal civilian life, but which are manifested in gross mental disturbance under the pressure of army routine, and (4) neuroses which occur as completely new phenomena in apparently well-adjusted individuals.

The prognosis of war neuroses is dependent on the age and intelligence of the soldier as well as on the duration and complexity of his mental illness.[1] Each case is a challenging new experience calling for new decisions and original insight. "If the neurosis has been acutely and recently synthesized or conditioned into being, it follows that early reconditioning offers a hope of recovery and improvement."[1] The urgency of early treatment should be reiterated. To anticipate that the soldier will become well without treatment is to regard his illness as unreal and unfounded.[12]

Rehabilitation has been defined[13] as "the restoration of the handicapped to the fullest physical, mental, social, vocational and economic usefulness of which they are capable." It includes physical, educational and emotional

7. Committee of National Research Council: Psychology for the Fighting Man, Washington, Infantry J. 1943, p. 456.
8. Williams, Vernon P.: Psychiatry, New England J. Med. 230:382 (March 30) 1944.
9. War Department, Washington, D. C.: Circular Letter No. 176.
10. Hirschberg, Cotter: Psychoneuroses in Military Personnel. Am. J. M. Sc. 208:119 (July) 1944.
11. Michaels, Joseph J.: The Medical Department of the United States Army in the World War (Neuropsychiatry), War Med. 2:172 (Jan.) 1942.
12. Kovács, Richard: Physical Therapy in War, Arch. Phys. Therapy 24:197 (April) 1943.
13. National Council on Rehabilitation, 1790 Broadway, New York: Pamphlet.

reconditioning. Rehabilitation and reconditioning are in the air as major postwar problems, especially in their relation to industry. In our country, where the young men have practically all gone to the defense of our principles, that essential legion of returning veterans must be given every therapeutic advantage in their restoration to fitness.[14]

Kovacs[15] stated:

> In the management of the neuroses physical measures play an indispensable part; they serve for the alleviation of symptoms, for general tonic effect and as chief adjuncts to psychotherapy. The application of physical medicine in nervous and mental diseases has been changed into some well-controlled, clinical methods resting on a rational theoretical and experimental basis.

Likewise, rehabilitation in the full sense of the word has been the fundamental objective in psychiatry for many years.[16] Solomon[17] remarked that "the problem of rehabilitation is a psychiatric one." Coulter[18] commented, "Their bodies have been treated but not their minds. Rehabilitation should start at the bedside of the injured patient and should include physical and occupational therapy and later vocational rehabilitation." A reconditioning plan for such patients demands that physical medicine be applied in its broadest sense.[19]

This brings to mind the nine steps in the complete plan for total rehabilitation as established by Krusen,[20] from the first step of immediate emergency care to the final step resulting in industrial rehabilitation. These measures are applicable from the onset of an acute neurosis to the later alleviation of chronic and pernicious neurotic symptoms. The Tomlinson[21] plan for the rehabilitation of war casualties includes the treatment of neuroses. Sargant,[22] after four years' study of 5,000 soldiers, stated:

> The work done in this unit during this war, and amply confirmed by other sources, has shown incontrovertibly the absolute necessity for the use of physical methods of treatment as the first line of attack on the really acute neurosis of recent origin and the value of these methods of treatment to remedy aggravation of even chronic neurotic states, provided physical methods are used with the same skill and discrimination that we have had to learn to use with psychotherapeutic technics in wartime.

History and diagnosis are important for an accurate determination of the type of psychogenic mechanism, as well as to exclude malingering.[23] The next step is the initiation of physical treatment based on sound physiologic principles.

A beneficial influence from World War I was the first real appreciation of physical therapy. The importance of rehabilitation in the case of war neuroses, including the provision of incentives for the patient to recover and the establishment of the correct attitude on the part of soldiers toward their illness, as well as the development of occupational and physical training, was conceded early in this war in the military neurosis centers, and they were the first to initiate comprehensive and systematic schemes of treat-

14. Reconditioning Program, Editorial: New England J. Med. 230:621 (May 18) 1944.
15. Kovács, Richard: Electrotherapy and Light Therapy, Ed. 3, Philadelphia, Lea & Febiger, 1938, p. 744.
16. Maclay, Walter S.: Neurotic Disabilities in a Total War: The Rehabilitation of Patients with Neuroses, Arch. Neurol. & Psychiat. 51:580 (June) 1944.
17. Solomon, Alfred P.: Rehabilitation of Patients with Psychologically Protracted Convalescence, Arch. Phys. Therapy 24:270 (May) 1943.
18. Coulter, John S.: Physical and Occupational Therapy in Rehabilitation, Arch. Phys. Therapy 24:295 (May) 1943.
19. Drewyer, Glenn E.: Physical Rehabilitation and the Department of Physical Medicine in a Naval Convalescent Hospital, Arch. Phys. Therapy 25:403 (July) 1944.
20. Krusen, Frank H.: The Place of Health Resorts in Rehabilitation Following Injuries, J. A. M. A. 125:905 (July 29) 1944.
21. The Tomlinson Report, Editorial, Lancet 1:113 (Jan. 23) 1943.
22. Sargant, William: Physical Treatments of Acute Psychiatric States in War, War Med. 4:577 (Dec.) 1943.
23. Knudson, A. B. C.: Physical Medicine in Neuropsychiatric Diseases with Special Reference to Veterans Administration Beneficiaries, Arch. Phys. Therapy 25:222 (April) 1944.

ment.[16] With time "the pendulum has swung far" in the application of physical medicine to psychiatric illnesses.[24]

Best known of the therapeutic physical agents is hydrotherapy, for the application of which there are a number of procedures. Hydrotherapy is famous for its sedative and tonic effect. According to Krusen,[25] "the full wet pack may be used to great advantage as a thermal measure in the treatment of psychoneuroses, hyperexcitability and insomnia." Partial and full body packs, blanket packs and wet sheet packs are all useful; ablutions, affusions, sheet baths, neutral baths, effervescent baths and oxygen baths can be used to advantage. The warm bath and the continuous warm bath are utilized to obtain relaxation. The "sedative pool" has a similar objective. The cold wet pack is an ideal measure for relief of insomnia due to nervous exhaustion; hot and cold douches are frequently employed. The needle shower has been termed "the refresher par excellence."[25] Overholser[26] stated that there are several technics of stimulative hydrotherapy:

> These are all more or less related and somewhat similar in principle, involving the application of cool water which is under more or less pressure and of various temperatures, accompanied or not by friction. The particular varieties depend in part on the physical condition of the patient and on his general cooperativeness. Some of them, in order to increase the contrast and reaction, may be preceded by a brief period under close observation in the electric bath cabinet or the vapor cabinet.

The utilization of heat for relaxation is classic. Light therapy, especially the use of radiant heat, has been found valuable in aiding relaxation; conversive heating by employment of short wave or conventional diathermy has been applied.[27] Cabinet baths are used to combat fatigue. It has been demonstrated[28] that a warm bath has a most remarkable and soothing effect on nervous conditions; warm water has a "reflex action on the subconscious." General light baths are also effective. General ultraviolet irradiation in mild, graduated doses may act as a stimulant to appetite and a sense of well-being. Radiant heat is commonly used to good advantage.

Mechanotherapy in its various forms is frequently used in the treatment of functional ailments. Short courses of massage are helpful in combating fatigue.[29] Massage is of value in the treatment of gastric neuroses. Krusen[25] has said: "Hysterical patients should not be given massage indiscriminately, but only by a person trained in the proper psychologic approach. Rhythmic, superficial stroking, which is very gentle and which will produce a sedative effect, should be employed in neurasthenia." Massage is of definite value in aiding general relaxation and also in the treatment of psychogenic backache.

The various forms of electrotherapy are beneficial in treating the neuroses. Kovács[15] has adequately described the many advantages:

> The interrupted sinusoidal or other low-tension and low-frequency currents applied to the abdomen help to overcome the motor and secretory weakness of the digestive tract. They may also be used for general body stimulation. The sexual weakness of neurasthenics often responds very well to the static-wave current applied to the prostate. Cerebral galvanism or diathermy may be considered in patients with stubborn head symptoms. Faradism is recommended for hysterical aphonia; the shock of painful stimulation brings back phonation in some patients. In paralysis, spasms and the variety of other disorders, static sparks and the interrupted sinusoidal current

24. Physical Treatment of Mental Disorders, Editorial, Arch. Phys. Therapy 24:169 (March) 1943.
25. Krusen, Frank H.: Physical Medicine; the Employment of Physical Agents for Diagnosis and Therapy, Philadelphia, W. B. Saunders Company, 1941, p. 846.
26. Overholser, Winfred: Physical Therapy in Psychiatric Practice, J. A. M. A. 123:32 (Sept. 4) 1943.
27. Behrend, H. J., and Weiss, Jerome: Therapeutic Relaxation, New York State J. Med. 41:1838 (Sept. 15) 1941.
28. Finn, N.: War Strain and Spa Therapy, South African M. J. 15:483 (Dec. 13) 1941.
29. Council on Physical Medicine of the A. M. A.: Physical Therapy, War Med. 2:295 (March) 1942.

may be applied. Electrodiagnosis by low-frequency currents has been recognized for many years as an invaluble aid in amplifying or corroborating clinical findings or in affording the means of important differential diagnosis between organic and functional or hysterical paralysis."

Krusen[25] has found daily "tonic electric bakes" valuable in cases of depressive psychoneurosis; they are followed by hot and cold contrast showers. It has been observed that suggestion and persuasion may be enhanced by the intelligent use of faradic and galvanic currents.[30] Definite psychologic effects may be observed with any form of electrical treatment; however, the effects of physical therapy are mainly physiologic[23] and the physician should not accredit the chief results to the psychologic component.

The results of electric shock therapy in the neuroses should be briefly mentioned. Two investigators,[31] in a follow-up study of their series of patients treated by electrically induced convulsions, found the results rather discouraging. Two other workers[32] treated neurotic patients with a combination of convulsive treatment and active psychotherapy, followed by efforts at reeducation. They found 50 per cent of the series had remissions; 45 per cent were much improved or improved, and 5 per cent were questionably improved. They stated: "The period of hospitalization for treatment of the neuroses is definitely shortened. Follow-up studies indicated a satisfactory adjustment and gain in inner resources in the vast majority of our patients. Shock therapy prepares the ground for psychotherapy." It has been observed[33] that acute war neuroses may be practically inaccessible to any contact but can sometimes be brought into rapport by means of hypoglycemia or by one or two electric shock treatments. Sargant[34] stated, "Convulsion therapy, however, should produce a rapid improvement in up to 75 per cent of those patients with a good previous personality and genuine severe depression."

However, in efficient treatment of the neuroses there is necessity for the use of physical medicine in its broader sense. According to Drewyer[19] this includes usual physical therapy procedures of recognized value, occupational therapy, physical training, corrective exercise, recreation, work therapy, education and entertainment. Included with these is the institution of relaxation therapy. It has been established[35] that a regimen of relaxation properly outlined and supervised is a valuable aid; the objective of many physical therapy measures is to secure relaxation. Along with this, short courses of massage, cabinet baths and hydrotherapy are indicated to combat fatigue.[36] Rest is a valuable means of promoting true relaxation. The prescription of vacations, increased rest and various forms of recreation plays an important role in psychotherapy.[37] Prescribed exercise often helps tense, anxious and hypochondriac patients. It has been suggested[37] that exercises tend to diminish the sensitivity of the nervous system, particularly the automatic apparatus; tension is relieved and reassurance is established. Considerable experience has been shown in accomplishing relaxation by influencing the respiratory system; in this connection breathing exercises are helpful. Fever therapy should be mentioned as an aid in the

30. Moersch, F. P.: The Psychoneuroses of War, War Med. 4:490 (Nov.) 1943.
31. Pacella, B. L., and Barrera, S. E.: Follow-up Study of Series of Patients Treated by Electrically Induced Convulsions and by Metrazol Convulsions, Am. J. Psychiat. 99:513 1943.
32. Moriarty, John D., and Weil, Andre A.: Combined Convulsive Therapy and Psychotherapy of the Neuroses, Arch. Neurol. & Psychiat. 50:685 (Dec.) 1943.
33. Kubie, Lawrence S.: Manual of Emergency Treatment for Acute War Neuroses, War Med. 4: 582 (Dec.) 1943.
34. Sargant, William: Physical Treatment of Acute War Neuroses, Brit. M. J. 4271:574 (Nov. 14) 1942.
35. Jacobson, E.: Cultivated Relaxation for Elimination of "Nervous Breakdowns," Arch. Phys. Therapy 24:133 (March) 1943.
36. Council on Physical Medicine of the A. M. A.: Manual of Physical Therapy, Chicago, American Medical Association, 1942, p. 35.
37. Lipkin, Mack, and Sharp, Lewis I.: Psychosomatic Medicine: Some Notes on Its Application in the Diagnosis and Treatment of Disease, Ann. Int. Med. 20:760 (May) 1944.

treatment of asthmatic patients, who likewise benefit from certain exercises. Of definite value are systematic training in proper body mechanics and the careful correction of postural defects. Control of muscular tension in the form of cultivated relaxation has been advocated by Jacobson for prevention of nervous relapse and as an aid in the therapy of nervous exhaustion.[35] The principles underlying remedial and therapeutic exercise and the practical aspects of prescription have been fully described by Elkins.[38] S. Weir Mitchell has been said to have revolutionized the treatment of neurasthenic and other functional nervous illnesses by his famous rest treatment along with hypernutrition.[39]

Great possibilities lie in the effective and economical utilization of the American spas and health resorts. Spa therapy is ideal for the proper development of climatology, balneotherapy and thalassotherapy. Ant and McClellan[40] have described the physical equipment essential for the efficient administration of spa therapy. The therapeutic program of the spa, which is built around natural agents, can be recommended for any preparedness or rehabilitation program.[41] It has seen said:[28] "The complete change of routine, away from worry, produces an almost miraculous metamorphosis. The mere suggestion of a cure at a spa has a reassuring, almost hypnotic effect on neurotics." Temporary removal from the habitual environment is in itself of inestimable value. It has been advocated[42] that nervous patients be carefully classified, given preliminary treatment at clinics and then referred to spas or special centers in the country. It has been stated[43] that spa treatment as a link between physical restoration and reconditioning has been acknowledged for the first time in this country, and such centers have been established by the Army, Navy and Veterans Administration. Krusen[44] emphasized that "there is an obvious need for the establishment of a large number of special rehabilitation or reconstruction centers which may perhaps best be placed at existing spas or health resorts." In the Veterans Administration such places are located at Saratoga Springs, N. Y.; Hot Springs, Salt Lake, Utah; Hot Springs, S. D.; Bay Pines, Fla.; Mineral Springs, Texas, and Excelsior Springs, Mo.

Occupational therapy is almost an indispensable subsidiary of physical medicine for rehabilitation and general mental stimulation. Restlessness and destructiveness are controlled by directing the patient's activity into useful channels. Occupational therapy not only obviates boredom but aids in the restoration of self confidence and self respect.[2] Occupational therapy is defined in our service as "any occupation, mental or physical, that is prescribed for and directed to promote recovery from a disease or injury, and to aid in the hospital or extramural adjustment of patients." This functional type of occupational therapy may be advantageously coordinated with physical therapy. Such coordination is best achieved when the physical and occupational therapy departments are directed by a physician specializing in physical medicine. In the same sphere, gymnastic, recreational and remedial exercises, sports and entertainment have been found most helpful adjuncts to treatment. The Council on Physical Medicine[45] has decreed, "Occupational therapy serves to train the disordered mind to maintain habits of nor-

38. Elkins, E. C.: Some Principles Which Underlie Therapeutic Exercise, M. Clin. North America 27:923 (July) 1943.
39. Piersol, Geo. Morris: Physical Therapy in Certain Medical Conditions, Arch. Phys. Therapy 24:5 (Jan.) 1943.
40. Ant, Herbert, and McClellan, Walter S.: The Physical Equipment for Administration of Health Resort Treatment, J. A. M. A. 123:695 (Nov. 13) 1943.
41. McClellan, W. S.: The Therapeutic Program of the Spa, Arch. Phys. Therapy 22:656 (Nov.) 1941.
42. Fox, R. F.: Physical Treatment, Lancet 1:1175 (June 29) 1940.
43. Physical Medicine, Editorial, Arch. Phys. Therapy 25:45 (Jan.) 1944.
44. Krusen, Frank H.: Wartime Physical Reconstruction, Mil. Surgeon 94:210 (March.) 1944.
45. Council on Physical Medicine of the A. M. A.: Manual of Occupational Therapy, War Med. 4:83 (July) 1943.

mal activity and to reestablish mental and muscular coordination." It is vitally important to keep idleness at a minimum, yet to make recreation possible. Debenham and his associates observed[46] that "occupation is even more valuable for the subchronically neurotic than for the acutely neurotic person, and for a stabilized return to a normal working civil life it is almost indispensable." The same workers found that, apart from the treatment of the acute panic reactions, physical and biochemical methods have a definite place in facilitating recovery in the later stages. To quote from the Report of the Baruch Committee:[47] "Morbid preoccupation and monotonous empty days in a hospital extend and increase mental disability. Occupational therapy substitutes constructive activity. Improved morale and lessened anxiety usually follow." Morale needs good health, physical and mental. Fatigue and neurotic illness sap mental vigor and moral strength. Morale can be further developed[7] "by the control of those psychological conditions which determine men's desires and conduct, and affect their attitudes toward one another."

Physical training, recreation, entertainment, education and vocational guidance are vital subdivisions of the over-all plan of reconstructive treatment in speeding convalescence and recovery in neurotic patients. Occupational-recreational programs are generally accepted as definite adjuncts in treatment of disease, especially mental illness.[18] According to Colonel Titus:[49] "The patient is not permitted to languish in his own beliefs, phobias or neurotic emotionalism. The intention is to obviate boredom and to keep mind and body active and occupied. The slogan is 'never a dull moment.' . . ." Extroversion is encouraged by supervising the patients in games, theatricals and group activities.[50] The therapeutic program is coordinated so that patients are interested and occupied during the day, and as a result they can better relax and rest at night.[44] The recreational work should be skilfully individualized. The inauguration of convalescent exercise and convalescent ward programs is a part of the picture. The essential aim is to reeducate and adjust the veteran to his occupation and environment. The establishment of rehabilitation centers at colleges and universities to provide job counseling and to arrange for vocational training is a promising endeavor. Proper vocational placement after treatment of the neurosis is one of the chief stabilizing factors.[16]

The necessity for a systematic and organized approach to the treatment of war neuroses is obvious. It has been stressed[1] that "the task is indeed a colossal one, for the number of neurotic soldiers will be legion, and it is the duty of the medical profession to have available every device which will cure or palliate disability and reduce the postwar liabilities which a neurosis imposes upon the individual and upon the community." The development of such a program has acquired tremendous momentum and the physical therapist's part is ever growing in its scope. The program must include every practical therapeutic process. Fundamental in the treatment of functional nervous disorders is "individualization."[51] Expert medical direction is of utmost importance. As stated by Wechsler,[52] "In no branch of medi-

46. Debenhan, G.; Hill, D.; Sargent, W., and Slater, E.: Treatment of War Neuroses, Lancet 1: 107 (Jan. 25) 1941.
47. Report of the Baruch Committee on Physical Medicine, April, 1944, p. 120.
48. Shulack, Norman R.: Occupational-Recreational Programs in Neuropsychiatric Sections of Army Station Hospitals, War Med. 5:109 (Feb.) 1944.
49. Lieut. Col. Titus' Rehabilitation Program (at Lawson General Hospital, Atlanta, Ga.), Medical News, Arch. Phys. Therapy 24:498 (Aug.) 1943.
50. Brussel, James A., and Wolpert, Harold R.: The Psychoneuroses in Military Psychiatry, War Med. 3:139 (Feb.) 1943.
51. Fishbein, Morris: Handbook of Therapy, ed. 11, Chicago, American Medical Association, 1937, p. 812.
52. Wechsler, I. S.: A Textbook of Clinical Neurology with an Introduction to the History of Neurology, ed. 5, Philadelphia, W. B. Saunders Company, 1943, p. 840.

cine does the therapist require so much tact, art, skill, knowledge and understanding as in the treatment of the neuroses." One of the first steps is to awaken the will to recovery and to obtain cooperation; from the first day in the hospital the patient's mind should be directed toward improvement and this interest should be constantly stimulated and encouraged.[53] The actual therapy which should be immediately executed in alleviation of acute combat neuroses involves two cardinal principles:[10] "the giving of complete physical and mental rest; the restoration of normal body metabolism and nutrition." It is to be questioned whether in the treatment of such conditions the possibilities of physical medicine have as yet been sufficiently investigated.[54] The majority of the neuroses are amenable to proper therapy.[55] It is believed that the intelligent use of physical measures forms an important adjunct to the work of the psychiatrist in the management of the neuroses. When physical therapy is employed to promote the general welfare of the patient in conjunction with proper psychotherapy, confidence frequently returns.[25] Physical medicine offers specially favorable conditions for simultaneous psychotherapy, although psychotherapy is a distinct entity in itself.[23] Kovács[12] has remarked, "The systematic application of physical measures as treatment adjuncts increases the patient's well-being and reacts favorably to his mental state, constituting a direct approach to his psychic self." It should be remembered that each patient presents an individual problem and should have a definite, systematic approach.[19] If a man was at one time a satisfactory and useful member of society, there is no good reason why he should not be restored to such a status, provided his conflict is analyzed and the indicated aid rendered.[56]

Additional factors which serve to supplement the large number of neurotic cases deserve mention. Kovács[15] has pointed out that, "Neurosis and organic pathological changes often co-exist and either may be the forerunner of the other; or they may be entirely separate from each other." Psychoneurosis frequently complicates physical disease; this is characteristic of the tropical diseases; almost every one of them has possible neuropsychiatric import. A considerable number of medical and surgical patients who might be expected to achieve ultimate complete recovery through the rehabilitation programs of the medical and surgical services will manifest maladjustment and delayed recovery because of neurotic mechanisms.[15] It has been observed:[57] "The Army has learned through repetitive experiences that a neurosis is as contagious as a virulent infection. For every neurotic patient that is hospitalized, there are ten men with potential neuroses who do not require much stimulation to react in a similar manner."

The widespread interest and the economic urgency of psychosomatic illness has brought psychiatry into close relationship with physical medicine. Overholser[26] observed:

> The interest of psychiatrists in physical therapy perhaps antedates that of any other medical specialty. As knowledge of the bodily factors in mental states has developed the utilization of physical therapy in psychiatric practice has gained. In addition to the direct effect on various bodily organs and organ systems, however, an effect is exerted on the whole patient by anything which modifies his physical environment, whether this is within his body, on the surface of his body, or in the world about him. In psychiatric practice two general classifications of physical therapy may be made. One includes the types which are prescribed primarily on account

53. Smith, O. F. G.: Rehabilitation, Re-education and Remedial Exercises, Baltimore, Williams & Wilkins Company, 1943, p. 424.
54. Pemberton, Ralph: The Role of Physical Therapy in the Rehabilitation of Disabled Soldiers, Am. J. M. Sc. 204:846 (Dec.) 1942.
55. Cecil, Russell L.: Textbook of Medicine, ed. 4, Philadelphia, W. B. Saunders Company, 1938, p. 1614.
56. Rehabilitation and Re-employment, Editorial, New England, J. Med. 230:205 (Feb. 17) 1944.
57. Eisendorfer, A.: Clinical Significance of Extramural Psychiatry in the Army, War Med. 5: 146 (March) 1944.

of the total behavior of the patient, that is, on account of his mental condition; in the other group are included numerous other forms of physical therapy which are useful even though they are directed toward systemic conditions or the conditions of the particular organs. The latter group of modalities likewise have a beneficial effect on the mental state of the patient, although this effect may be referred to as in some ways a by-product.

I should like to present 5 cases in which rehabilitation of patients with severe neuroses was attempted.

CASE 1. — W. H. (enlisted Oct. 27, 1942; discharged June 12, 1944), a 23 year old white soldier, married, was admitted on June 12, 1944 by transfer from the Station Hospital, Fort Francis E. Warren, Wyo., with a diagnosis of chronic encephalitis. He had been admitted to the hospital in Wyoming on April 24; he was observed to have a coarse tremor of the right arm and left leg and loss of associated movements of the right arm. The history elicited at our hospital revealed that the patient was an only child, whose mother, then 17, had died when he was born. He had never known his father, but stated that he had heard he was "no good." He was raised by his aunt and uncle, who quarreled frequently with one another and often mistreated him. He gave a history of marked nervousness in childhood, nail biting, nightmares and temper tantrums. In October, 1942 he married a mulatto woman, and this served to increase his conflicts. He stated that his condition became worse on his entrance into the Army; he could not adjust to army life and it aggravated him to take orders. His conduct in the ward was dramatic and grotesque in the exaggerated manner with which he maintained his posture.

Neurologic examination failed to reveal any organic disease. The physical examination and laboratory studies gave entirely negative results. Intensive study resulted in a diagnosis of psychoneurosis, conversion hysteria, hyperkinetic type. Treatment consisted of psychotherapy, suggestion, reassurance and physical therapy, including ultraviolet irradiation. The patient was discharged on June 28, after sixteen days, with his neurotic symptoms markedly improved. He stated that he had definite ideas for the future, for obtaining employment and for making a real home for his wife.

CASE 2. — H. B. (enlisted Sept. 14, 1942; discharged Aug. 4, 1943), a 32 year old white man, unmarried, was admitted to the hospital on April 26, 1944 from his home, with a diagnosis of "old injury, left knee." The patient stated that his knee disability was caused by an injury incurred while he was playing a game at Camp Grant; he stated that the medical officer had merely placed him on light duty. Frequent complaints resulted in hospitalization, but according to his statement none of the treatment given helped his condition. Later he was discharged. The family history disclosed the fact that his mother had been in a state mental hospital for twenty years. The veteran said he had suffered from marked bashfulness during childhood; recently he had become upset over a quarrel with his fiancée.

A roentgenogram of the left knee showed nothing significant, and examination of the knee revealed no objective findings. The diagnosis was psychoneurosis, hypochondriasis. Treatment consisted of psychotherapy, in the form of persuasion and suggestion, and physical therapy, including infra-red ray treatments, cabinet baths, needle showers, whirlpool treatments and short wave diathermy to the knee. The patient was asymptomatic at the time of his discharge from the hospital on May 25, twenty-nine days after admission. At the latest report he was working in a defense plant.

CASE 3. — J. B. (enlisted July 17, 1942; discharged Feb. 19, 1943), a 21 year old white man, single, was admitted to the hospital from his home on April 19, 1944 with a diagnosis of "neuropsychiatric condition, undetermined." The history obtained revealed that the onset of symptoms occurred in September, 1942, two months after enlistment. The patient stated, "I should fight for my country and I haven't been doing it." There was evidence of mental conflict. A diagnosis of dementia praecox, unqualified, with hebephrenic symptoms, was made. The history given by the patient indicated an onset with vibration of the legs and marked tremors of the arms; he could not sleep; he was "jumpy," and noise scared him. He was dicharged from the Army and sent to a state (Illinois) hospital, from which he was released to his home in August, 1943.

In our hospital the patient was found to be very excitable, unstable and suggestible. Excessive perspiration and definite dermographia were present. No schizophrenic trends or bizarre behavior were evident. Physical examination gave essentially negative results except to reveal moderate obesity. A diagnosis of psychoneurosis, conversion hysteria, hyperkinetic type was made. Treatment consisted of ex-

tensive psychotherapy, including forceful suggestion and reeducation, and physical therapy, including cabinet baths, needle showers and whirlpool treatments. The patient was definitely improved when he was discharged on May 13, 1944, twenty-four days after admission. Interviewed since on two occasions, he shows that he has made a good adjustment and is happy; he is working in a defense plant and plans to get married.

Case 4. — L. B. (enlisted Oct. 23, 1943; discharged May 4, 1944), an 18 year old white youth, married, was admitted to the hospital from Schick General Hospital, Clinton, Iowa, on May 4, 1944 with a diagnosis of "hysteria, anxiety type." In March, while he was home on furlough, there had occurred an episode of amentia in which he had attempted self destruction. The history elicited in our hospital revealed marked psychopathy and neuropathy in the family, with abundant psychogenic factors. The home life was insecure, and the patient had suffered mistreatment in early life at the hands of his father. There had been enuresis until the patient was 9. He had always been bashful. The father was a bootlegger and a heavy drinker who often abused his children; the mother was subject to fits. The patient was married in July, 1943 to a girl of 15. The subsequent marital adjustment was fair, although the sexual adjustment was poor. The patient stated that he had the "blues" and homesickness in the Army. He was found to be emotionally unstable, preoccupied and unable to adjust socially because of fears and a feeling of inferiority. The physical examination gave negative results.

The diagnosis made was psychoneurosis, mixed type, with hysterical, anxiety and depressive features. The treatment included the usual hospital routine; psychotherapy, with short therapeutic interviews in the form of explanation and reassurance, and physical therapy, including ultraviolet irradiation. The patient was discharged May 15, eleven days after admission, much improved and in good psychic equilibrium. He stated: "I feel good now, sir, better than I have for a long time. I am happy, too. I'm going to start my life over and get somewhere." A letter received from him, dated July 28, said that he was working for a milling company and feeling well.

Case 5. — M. R. (enlisted June 30, 1941; relieved of active duty November 8; recalled Jan. 30, 1942; discharged Jan. 1, 1943), a 34 year old white man, single, was admitted to the hospital from his home on April 19, 1943 with a diagnosis of "chest condition, undetermined." He stated that in 1939 he was working as a supervisor on a construction job. The work was dusty; a cough and pains in his chest developed and he thought he was getting tuberculosis. Negative roentgenograms did not change his mind. He had been a problem child; his mother had always been a "nervous woman." He complained of headaches, throbbing in the back of his neck, difficulty in concentration, a feeling that his mind was going blank, a feeling that his hands and feet were going to sleep, difficulty in keeping warm, twitching of his eyes and eyebrows, ringing in his right ear, sickness of his stomach at 10 o'clock in the morning and sometimes seeing double. He showed a vigorous emotional display and frequent weeping. Roentgenograms of the chest and lungs and physical examination gave negative results. His very appearance left no doubt as to the psychogenesis of his disability. The neurosis was deep and comprehensive and encircled all his thoughts.

The diagnosis was psychoneurosis, mixed type, with hysterical and neurasthenic features. Treatment included hospital routine; sedation; intensive psychotherapy, with frequent therapeutic interviews, and physical therapy, including cabinet baths and needle showers. The patient was discharged June 3, forty-five days after admission, remarkably improved, with good morale and a sense of well-being. Letters received from time to time, the last dated July 27, 1944, indicate that he is working and making a good adjustment in every way.

The neurosis in this case was perhaps the most severe, and yet the outcome was as good as in the other 4.

Strecker[58] commented:

By far the most costly item of military medicine of World War I was the neuropsychiatric casualty list. When the day of reckoning comes it will be larger and even more costly for the present global conflict. Therefore, at the levels of economic considerations, military effectiveness and morale, the war neurosis attains the doubtful distinction of being the most important military-medical issue of modern war.

In this connection, there has been considerable controversy concerning

58. Strecker, Edward A.: War Neuroses, Mil. Surgeon 94:196 (April) 1944.

the payment of compensation for war neuroses.[59] Mock[60] stressed the fact that "pensions and compensations are crutches which retard rehabilitation just as surely as the crutches on which a temporary cripple becomes dependent retard his recovery, thus reducing the effectiveness of the provisions for rehabilitation." He continued, "Rehabilitation of the psychoneurotic must be handled with intelligence and caution lest a permanent psychoneurosis be established." It has been further contended:[52] "It would seem advisable to make immediate financial settlements and thereby remove all economic incentive to further sickness." The lump sum settlement appears to be the most favored.

The Report of the Baruch Committee[47] emphasized, "It is evident that a tremendously significant contribution can be made by providing, at this time, a completely adequate teaching and research program in physical medicine on a national scale." Basic and fundamental research along new lines of investigation will no doubt bring to light efficient technics of therapy.[61] It might be mentioned incidentally that a recent campaign of prehabilitation, according to Colonel Rowntree,[62] "accomplished much, particularly in making the nation conscious of national health needs and in laying the foundation for programs for physical restoration and physical training and for programs of prevention." Pollock[63] has raised an interesting research question concerning the relation of patterns of behavior to external stimuli and environmental changes in man. The recent gift of Mr. Bernard M. Baruch (April 26, 1944) for the teaching of and research into physical medicine will give impetus to the solution of all such problems.

Krusen[44] has said, "Perhaps 25 per cent of the patients disabled by the war present some type of neuropsychiatric disturbance which can be benefited greatly by the judicious employment of physical and occupational therapy." The employment of physical agents in the treatment of diseases of the nervous system is becoming increasingly important. To quote Krusen and Elkins,[64] "Adequate facilities for the physical treatment of patients are necessary in peacetime, and they become even more essential in wartime." It is interesting to note in a recent issue of *The Journal of the American Medical Association*[65] that Mason General Hospital, Brentwood, Long Island, N. Y., was turned over to the Army Medical Corps on June 22, 1944 and was "dedicated to the recovery of psychoneurotic casualties from both battle and training areas." It was stated:

> The hospital can handle 1,348 patients normally and 2,500 in an emergency. The Army also has established at the hospital its special school for training medical officers in psychoneurology. It already has 1,000 on such duty and will add 70 graduates of classes which go through the hospital every three months. These graduates go directly to the front. The faculty of the school is headed by Col. William C. Porter.

Hospitals, centers and outpatient clinics, providing unlimited therapeutic facilities and designed specifically for the treatment of neuroses, may be a prospect of the future, and that particular application of physical medicine may become known as "physical neurotherapy."

The Veterans Administration has been engaged in rehabilitation work since World War I and will have heavier responsibilities than ever in the

59. Wechsler, Israel S.: The Neuroses, Philadelphia, W. B. Saunders Company, 1929. Lewy, Ernest: Compensation for War Neuroses, War Med. 1:887 (Nov.) 1941.
60. Mock, Harry E.: Rehabilitation, Arch. Phys. Therapy 24:676 (Nov.) 1943.
61. Moersch, Frederick P.: Progress in the Treatment of Mental Disease, J. Nerv. & Ment. Dis. 97:491 (April) 1943.
62. Rowntree, Leonard G.: National Program for Physical Fitness, J. A. M. A. 125:821 (July 22) 1944.
63. Pollock, Lewis J.: Effect of Extremes of Environment Change on Man, Arch. Neurol. & Psychiat. 49:421 (March) 1943.
64. Krusen, Frank H., and Elkins, Earl C.: Teaching of Physical Medicine in Relation to the War Effort, Arch. Phys. Therapy 24:543 (Sept.) 1943.
65. Army Takes Over Mason General Hospital, J. A. M. A. 125:916 (July 29) 1944.

future. From the rehabilitation standpoint the actual amount of lifelong neurotic invalidism will be greatly influenced by an effective program of Veterans Hospitals for the rehabilitation of discharged veterans of World War II.[23] Dr. Charles M. Griffith,[66] medical director of the Veterans Administration, has stated:

> Physical therapy, occupational therapy, supervised exercise, recreational functions and library activities are each a part of a therapeutic program designed to assist in the reestablishment of the patient as an economic unit. The immediate and future plans for hospitalization of disabled veterans include further study and development of physical medicine as an important element in the rehabilitation program, particularly under war conditions.

It is certain that any aid possible from physical medicine should be fully utilized, for the veterans will seek it from nonmedical sources if denied it by hospitals and doctors of medicine. The responsibility of all of us in the constructive field of physical medicine has never been greater, and the way may be long and tedious. We have a big job to do; let us do it, and let it be stressed that time is of crucial import and should not be dissipated, for with delay reconditioning becomes progressively less possible. The proper rehabilitation and reemployment of these veterans is of the utmost importance. They deserve to get well and resume useful lives. To restore them is to insure the future strength of our country!

66. Griffith, Charles M.: Physical Therapy in the Veterans Administration, Arch. Phys. Therapy 25:265 (May) 1944.

Discussion

Lieut. Col. Charles R. Brooke (Washington, D. C.): The problem involved in the physical rehabilitation of patients with neuroses among veterans differs in many respects from other disabled veterans because of the variable mental states existing alone or coexisting with variable physical disabilities which require adequate medical and surgical treatment. We should always keep in mind the importance to administer treatment to the individual needs of the patient and never fit the needs of the patient to methods or apparatus that are available. The speaker has stated that there are many types of neuroses and his selection of the title "war neuroses" seems adequate to cover the different types that occur. These different types are naturally known to vary in degree. The incidence of neuroses is high and the percentages quoted by the speaker substantiate this fact.

Rehabilitation has been clearly defined. Veterans suffering from war neuroses should have the advantage of the fullest physical, mental, social and vocational management that it is possible to give to them. The Army Air Corps and the Army hospitals are now carrying out extensive programs for the reconditioning of disabled servicemen. The problem of the Veterans Administration is to carry out a full program of physical rehabilitation for the disabilities seen in veterans and further to carry out a program of vocational rehabilitation in order to overcome physical handicaps to the extent that the veteran is able to engage in a gainful occupation.

The application of physical medicine in nervous and mental conditions plays an important role in recovery and should be used in its broadest sense at all times. The value of physical therapy has been known and used in the treatment of neuroses from World War I and has been based on sound physiologic principles. Therefore the undertaking of the treatment by physical medicine of large numbers of persons with neuroses can be accomplished more easily and more satisfactorily by beginning the treatment in the early stages and following it through with an individualized program.

Hydrotherapy is the best known of the therapeutic physical measures for the treatment with other indicated physical agents. The utilization of light and heat therapy has been found valuable for the relaxation and soothing effects on nervous conditions. The use of general ultraviolet irradiations and heliotherapy are valuable adjuncts which can be utilized when indicated. When there are mental disabilities coexisting with physical conditions, the use of massage, exercise and suitable mechanotherapy can be employed to advantage. The application of mechanical exercise rather than massage is advocated particularly for hysterical patients.

The author has referred to the use of various forms of electrotherapy such as interrupted sinusoidal and other forms of low frequency current, as well as high frequency currents. In some instances the application of faradic current is beneficial for hysterical patients, particularly those suffering from aphonias. The use of low frequency currents for electrodiagnostic purposes is a valuable procedure that should be used as a means of differential diagnosis between organic and functional or hysterical paralyses.

Electric shock therapy is used in some of the large neuropsychiatric hospitals with good results. Psychotherapy should be employed in many types of these cases.

Spa therapy is recognized and is an effective method for the treatment of neuroses. The advantages in a program of spa therapy are many. The Veterans Administration has facilities for spa therapy located throughout the United States at, for example, Saratoga Springs, N. Y.; Hot Springs, Ark.; Salt Lake City, Utah; Bay Pines, Fla., and Mineral Springs, Mo.

Occupational therapy either prescribed in conjunction with physical medicine or immediately following completion of physical therapy is essential and necessary for full physical rehabilitation in patients suffering from war neuroses. Occupational therapy aids in the restoration of many coexisting physical disabilities as well as in giving self confidence. It keeps the patient busy, thereby diverting his mind from his ailments. There should be close cooperation of efforts in the physical and occupational therapy departments at all times. In the Veterans Administration, a physician is designated to be in charge of physical and occupational therapy departments who has had specialized training in this field.

Physical training, recreation, entertainment, education and vocational guidance are necessary adjuncts in the physical and mental rehabilitation of war neuroses. After full physical and mental rehabilitation has been accomplished the veteran is then referred to the proper prevocational and vocational center so that it can be arranged for him to persue some suitable training for vocational rehabilitation.

The author points out that for war neuroses occurring in veterans of World War II, physical medicine should be prescribed including occupational and recreational therapy in order fully to rehabilitate them and prepare them for proper vocational rehabilitation in order that they may be able to follow some gainful occupation and become useful citizens in their respective communities. The author is to be congratulated on this excellent paper and commended for his efforts in the treatment of veterans with war neuroses.

Capt. A. B. C. Knudson (closing): The general public is not aware of the magnitude of the problem of rehabilitation with its social and economic implications. None of us can visualize the possibilities of our efforts in reconditioning our veterans and returning them to civil life, nor can we predict our success in these attempts. Careful psychologic and psychiatric evaluation of neurotic cases is most essential; the initiation of psychiatric and physical therapy programs under expertly supervised medical direction should be instituted as early as possible. Solomon [J.-A. M. A. 121:865 (Mar. 13) 1943] has advocated the construction and equipment of large gymnasiums for "competitive sports, swimming, occupational and physical therapy, staffed by psychiatrically trained physical directors and occupational and physical therapists." He found that because of the frustrations and conflicts involved such patients "will cooperate in a treatment which offers them diversion, recreation and play, good body development and amiable companionship, even if the acceptance of that treatment denies the further existence of the convalescence." As the patient progresses and notices improvement he will cooperate to the point of recovery. Average cases may require from six weeks to three months of therapy. The expenditures for such a program would be many times saved in reduction of compensation awards.

FUNCTIONAL TREATMENT OF FRACTURES AND OTHER INJURIES *

EDWARD HARLAN WILSON, M.D.

The First World War established the principle of skeletal traction as a permanent treatment of shaft fractures. It also established the principle of debridement. It failed to produce a means of preventing osteomyelitis, and it likewise failed to bring forward a treatment for shock. When the Second World War began, methods of efficient treatment of shock and infection had already been advanced and were ready for use. This has permitted the saving of life in cases of severe fracture and has greatly hastened the healing of compound wounds through the prevention and early cure of infection. The consequence has been the fixation of interest in rehabilitation of the injured. It is probably safe to say that the great contribution of fracture treatment in this war will be that of functional rehabilitation and, as part of that, interest in those methods which best contribute to early and good functional recovery.

After the First World War, surgeons returned to civilian practice well educated in the use of skeletal traction, and the intervening years have led to further appreciation and evaluation of its usefulness and limitations. Its chief fault was found to be the frequency of distraction and resulting delay in union, especially in the forearm and lower leg and, to a certain degree, also in the femur. In the humerus, even 2 or 3 pounds of traction has been found sufficient to produce distraction. Böhler, once a great advocate of skeletal traction and countertraction for fractures of the forearm, later abandoned the method entirely because of the frequency of nonunion due to distraction, and substituted for it a method of manual reduction and pull which has been more satisfactory. There have been a number of studies showing that fractures of the femur treated by skeletal traction have a longer healing time and an increased incidence of nonunion.

Early in the present war came the realization that functional results of fractures were frequently very bad. By this I mean that either function was too long delayed or, as in a fairly large percentage of fracture cases, full functional recovery failed to develop. Before our entry into the war, the Royal Army Medical Corps of Great Britain had found that with the ordinary methods of treatment not a single man with fracture of the femur had been rehabilitated back into active service a year after injury. Peacetime records will, of course, show a better average than those of wartime, owing to the much greater extent of soft tissue injuries in compound fractures from war causes. At the same time, reviewing a series of simple fractures of the femur treated in peacetime, one is struck by the extremely poor results in motion of the knee. Knee motion probably constitutes the most severe challenge now made to the methods in use for treatment of this lesion. It is of interest to note the early realization of the need to improve functional results. It is not beyond reason to hope that the experience of the Second World War will contribute something of permanent value toward directing fracture treatment to those methods which will most satisfactorily bring about rehabilitation of the patient.

In considering the problem of the stiff knee which so commonly follows fracture of the femur, one sees ample evidence that the principal cause is

* Read at the Twenty-Third Annual Session of the American Congress of Physical Medicine, Cleveland, Sept. 6, 1944.

damage to the extensor group of muscles of the thigh with formation of dense scar tissue and adherence to the anterior surface of the femur. Attack is being made on the problem on the one hand by choosing those methods of treatment of the fracture which are most conducive toward maintaining some motion of the knee during the period of fixation. On the other hand, Col. T. Campbell Thompson of the United States Army Medical Corps, has approached the problem from the viewpoint of excision of the scar and freeing of the extensor muscles in an effort to correct the condition once it has occurred. There is considerable promise in this effort, but it is yet too early to judge its results in a large number of cases.

From the point of view of treatment there are three methods of attack. First there is the use of skeletal traction in connection with a flexed-knee splint, such as the Pearson attachment to the Thomas splint, with maintenance of passive and active knee motion throughout the period of splinting by means of balanced suspension. This is the oldest method available and is sometimes defeated because of pain resulting from motion at the site of fracture. The second method, toward which there is an increasing tendency, consists of open reduction with internal fixation, followed by early motion, and is dependent on the solidity of fixation at the fracture line. Dr. Clay Murray, of the Presbyterian Hospital, New York, has for years used this method in selected cases. There can be no doubt that there is an increasing tendency toward open reduction by competent surgeons. This has been made possible by the margin of safety which has resulted from the local and general use of sulfanilamide, while at the same time the development of non-irritating metals has lessened the danger of local irritation. The danger attending open reduction is the difficulty of determining how much strain the fixation at the fracture line will permit. Murray believes that open reduction, if it is to be carried out, should be performed within twenty-four hours if possible. He points out that absorption of the fracture margins may begin promptly and that in the case of late open fixation, in the face of increasing absorption, the fixation plate may serve only to confirm a gap which will develop if absorption continues. He believes that early fixation with impaction of the fragments prevents such absorption by restoring the demand for skeletal support.

The third method of treatment which offers hope of a solution of the problem of knee stiffness is the so-called half-pin method exemplified by the Roger Anderson, Stader and Haynes apparatus. The reports on this method are extremely conflicting. Those most familiar with it report excellent results without complications. The American Hospital in Britain, which treated over 350 fractures of the femur both simple and compound, reported excellent healing and functional results without any serious complicating infections at a pin site. On the other hand, Army experience has led to condemnation of the method by many Army authorities.

The benefits to be obtained from the method are as follows: A short time after fixation has been accomplished the patient is able to be up and about, with great benefit to his general condition and with vast shortening of his hospital stay. He is able to begin modified weight bearing with about 25° degrees of knee motion. The experience is that after removal of the apparatus, when healing has occurred, knee motion rapidly increases and in a few months has attained a fairly normal range, this result being attributed to the constant active motion of the knee through a limited range during the period of treatment. Another advantage is that the fracture can be adjusted from time to time as absorption occurs in the margins of the bone.

The disadvantages are the reported localized bone infections, the oc-

currence of pain at some of the pin sites (the upper pin site in the region of the hip is always painful owing to the amount of motion in that region) and, lastly, the fact that only 25 degrees of flexion is permitted by the apparatus because of the impingement on the vastus externus by the lower pins. I have found that there is a great deal to be learned about the method if complications are to be prevented. Reduction is often difficult, but once attained is rigidly held. The pins must pass through both cortices and the patient must use care to prevent striking the apparatus against persons or other obstacles, which might result in fractures around the pin sites. It is extremely useful as a means of retention after bone grafts, as such operations are always performed after a prolonged period of treatment, when wasting and stiffness are already well advanced.

In the past twenty years there have been improvements in the treatment of other fractures which have shortened the period of recovery and made functional recovery more certain. Nailing of fractures of the neck of the femur, with freedom from splinting, has led to complete functional and anatomic recovery in over 70 per cent of cases. Open fixation of fractures of the trochanter marked an advance in the treatment of older patients. While such fractures will unite with almost any form of treatment, the ability to begin movement immediately after open fixation results in a quick return to function in the limb and also prevents degeneration of general health from prolonged recumbency. Fractures of the neck of the humerus under the old treatment of prolonged splinting, with the arm frequently in the position of abduction, resulted in prolonged stiffness in the shoulder region. This method has been generally replaced by the method of manipulating the upper arm much as though a dislocation were present. An impacted fracture will usually result, and, just as in the case of impacted, undisplaced fractures, early motion may be begun in a few days. If the treatment is properly carried out, the patient will usually show a fairly normal range of motion within six to seven weeks after injury. The treatment of fracture of the patella by excision of a portion or all of the patella, according to the amount of comminution, converts reduction of this formerly troublesome fracture into a bone tendon suture. Motion can be begun three weeks after injury, and normal function can be attained within a period of eight weeks from injury. Patellar fractures were a fruitful source of permanent impairment of knee function with the old methods of wiring and waiting for union to occur.

Fractures close to or involving a joint will continue to require splinting. Open reduction, when feasible, will often permit earlier motion and return of function. Early motion after manipulative fractures near the wrist and ankle is to be decried; it merely leads to prolongation of the recovery period. Open reduction of all fractures is increasing. Open reduction is justifiable, I believe, whenever it will bring about earlier return of function. On the other hand, return of function may be greatly delayed by premature manipulation in the presence of marked soft tissue damage in any joint region. I believe that the principal cause of Volkmann's contracture is the early reduction of elbow fractures in the presence of marked swelling. Such fractures should not be treated until the swelling has reduced to the point where the bony landmarks can be easily palpated. The same principle applies to fractures near the ankle, where early manipulation often results in blister formation, sloughing and other evidence of circulatory interference. Conservatism in the presence of marked damage of tissues is essential in the obtaining of a good result, and failure to observe it may greatly prolong the return of function.

Joint fractures which show irreparable damage should have arthrodesis performed within two or three weeks after injury. If this is done, great saving of time will have been accomplished, as the alternative is an operation months afterwards, with prolonged delay in recovery of use. Sudeck's atrophy, which occurs so frequently in the wrist and not infrequently in the ankle, has long been an unsolved mystery which has sadly interfered with functional return. In this condition swelling and pain result almost immediately after reduction. Wasting of muscles develops, with, in the end, marked muscular contractions of the forearm and shoulder. DeTakats has recently ascribed the condition to injuries of small pain nerves and has advanced the theory that these, proceeding to the higher centers, produce motor stimuli which result in hypertonicity and contraction of the involved muscles. He has advocated the use of procaine hydrochloride infiltration carried out daily in an effort to abort the condition. I believe that Sudeck's atrophy also may result from early manipulation in the presence of extensive soft tissue damage. When marked swelling exists I place the fractured member on a pillow with an ice bag and postpone reduction from five to seven days. My experience has been that manipulative reduction is easily accomplished at this time, after the swelling has been reduced. None of the patients has developed Sudeck's atrophy, but the series is entirely too brief to warrant any claims as to the effectiveness of the method in relation to atrophy.

Finally, physical therapy has a very important place in rehabilitation. It is largely a psychotherapeutic method, in that the patient is educated to begin to use his muscles in the region of a fracture and is taught how to do so without pain or injury to himself. Hypertrophy of the wasted muscle is encouraged. Its use, especially early in fracture treatment, should be limited to assisted active motion with the patient's sense of pain as the guide to the limit of motion. When the patient has definitely learned to move his limb and to place weight on it, physical therapy has accomplished all that it can and its further use will tend to retard the patient's progress because his condition combines local weakness and stiffness with general weakness due to his prolonged period of rest. The experience of the British in this war in the use of rehabilitation camps, and more recently the experience of our own Army, has emphasized the importance of prolonged and extremely active physical exercise. This has been obtained by early marching drill, even for men in casts, with the prompt addition of graduated games such as volley ball and tennis, sawing lumber, swimming, etc., until the patient is active about six hours a day, which is the limit of his endurance. By the use of these methods tremendous progress has been made in the rehabilitation not only of injured limbs but of men themselves. To consolidate these gains for civilian life it will now become necessary to develop rehabilitation centers in industrial cities where not only physical therapy and occupational therapy are furnished but also exercise which exploits the patient's liking for competition and fun.

PHYSICAL MEDICINE IN INDUSTRY

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Even before the outbreak of the present war, industrial management and the industrial physician were impressed with the value of physical medicine in their field. Military medicine served only to give an added impetus. As Dr. Ober, of Harvard, observed, "The last war established orthopedic surgery as a recognized specialty. This war may well do the same for physical medicine."[1] This prophecy seems to be on the way to fulfillment.

In response to the need for the services and benefits of physical medicine, many industrial plants have established a modern physical medicine department as an integral part of their plant medical setup, or have initiated a program for its eventual establishment. As long ago as October, 1941, such a department was organized in our Rahway plant, which had at that time approximately 2,500 employees. Since it has now become well established and thoroughly equipped, and has proved its value, it may be used as an example.

The first step in the organization of this physical medicine department was the allotment of floor space, which was scarce at that time. Beginning as a unit of the plant health department, in a room measuring only about 8 by 10 feet, it was finally given sufficient space (approximately 600 sq. ft.). A qualified technician was engaged, and physical medicine became a functioning unit of the plant health service, in the same building, and operating under the general supervision of the medical director.

While the floor space at that time was adequate, the layout was far from ideal. However, the need for easy access from other sections of the plant health department was met. This feature was felt to be, as Dr. Krusen has pointed out in his book,[2] quite as important as having the roentgenologic department and the clinical laboratory conveniently situated.

Although the service was thus started on a modest scale, the business executives of this large industrial organization recognized the fact that physical medicine was "good business" and made provision for expansion of the work to its present proportions.

The allotted space was divided by partitions hung from wall brackets, with a supporting leg in front, so that they could be moved at will. This made the division of space flexible. The equipment used in this department is listed below.

A. Hydrotherapy room.
1. Stationary equipment.
(*a*) Full-length bath tub and shower.
(*b*) Contrast bath tub.
2. Portable equipment.
(*a*) Two whirlpool baths (one for arm and hand, one for foot and leg).
(*b*) Easily movable massage table.
(*c*) Four large basins (for various types of soaks and baths).

1. Ober, F.: (Cited by F. H. Krusen, J. A. M. A. 125:1093 (Aug. 19) 1944).
2. Krusen, F. H.: Physical Medicine, Philadelphia and London, W. B. Saunders Co., 1941.

(*d*) Two "Cooley compresses" [3]

B. Room for other therapeutic procedures.

1. A plinth and chair for each cubicle (the plinth has built-in shelves for storage of linens and other supplies).

2. Three infra-red ray generators.

(*a*) Two luminous lamps.

(*b*) Two nonluminous lamps.

(*c*) Two luminous body bakers.

3. Two ultraviolet ray lamps:

(*a*) One for local irradiation of small areas.

(*b*) One for general irradiation.

4. One short wave diathermy machine.

5. Wall plates for electrodiagnosis and electrochemical procedures.

6. Exercise apparatus.

(*a*) Posture mirror.

(*b*) Shoulder ladder.

(*c*) Shoulder wheel.

(*d*) Exercise mat.

(*e*) Stall bars.

(*f*) A hand, wrist and elbow exercising table (Kanavel).

C. Toilet and dressing room with two small lockers.

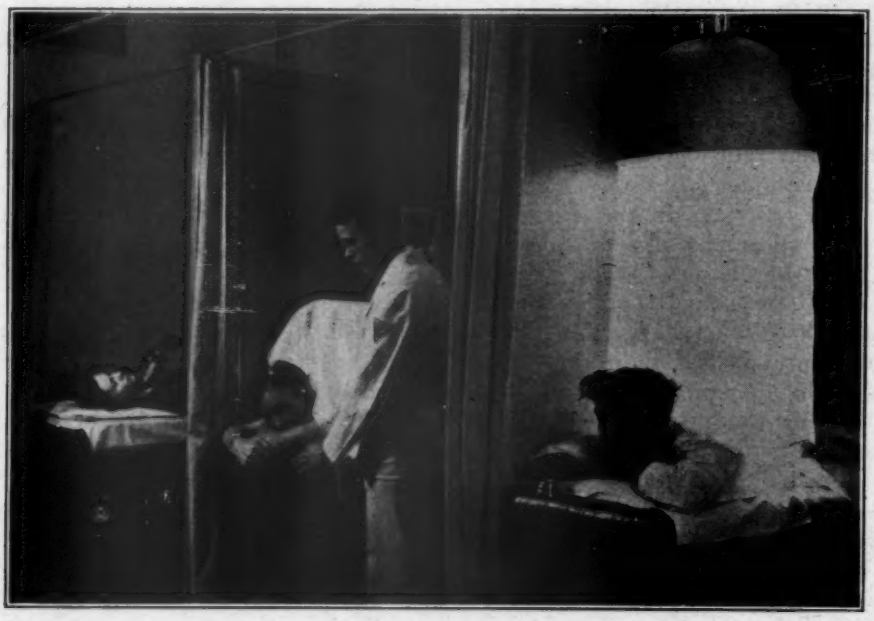


Figure 1 illustrates some of this equipment in use and arrangement of cubicles.

Daily schedules and records were set up in order to make the physical medicine department function more smoothly and fit in with the work program of the company.

A daily schedule is kept, showing the name of each patient and the type and time of treatment. If any subsequent treatment is prescribed, the patient is given an appointment which is recorded on the schedule. These schedules can be used for case summaries on a weekly, monthly or yearly basis.

A statistical record termed physical medicine record is made active on the patient's first visit to the department. It includes data gathered from his dispensary record and spaces for new entries, as follows:

3. Trade name for a rheostatically controlled, thermometrically gaged, rubber-encased, shock-proof heating pad.

Name, age and sex of patient.
Diagnosis, location of the lesion and cause of injury.
Factory department, building number and process in which the patient works.
Date of onset of the present condition.
Prescription and prescribing physician's signature.
Whether or not the condition is due to an occupation circumstance.
Whether the patient was put on "special work" and if so when removed.
A calendar for recording daily visits.
Any change of prescription made in the course of treatment.
Final disposition of the case.

All of these data are on one side of the physical medicine record; on the reverse side is space for daily progress notes. If further space is desired, blank ruled cards of the same size can be stapled to the original card.

When the case is closed, its final disposition is recorded on the physical medicine record, and then the card is placed in a "closed case" file. This file becomes a valuable source of information for statistical purposes.

The administration of the physical medicine department consists of medical supervision and technical management.

The medical staff functions by examining each patient, diagnosing his condition and prescribing the type of physical medicine he is to receive. The prescribing physician knows the indications and contraindications for all the requested procedures. In addition, experience has shown that he should be acquainted with the technic of each therapeutic procedure, so as to be able to prescribe in more minute detail.

The managemet of our physical medicine department is directly under the charge of a registered physical therapy technician, who receives the close assistance and cooperation of our registered nurses. All work is carried out under the supervision of the medical staff, and regular conferences are held with the physicians concerning the treatment progress of the patients. The department manager is responsible for making subsequent appointments for patients, keeping case records, seeing to the upkeep of equipment, ordering supplies and compiling statistics. Each nurse in the plant health department is registered and has received a course in the rudiments of physical medicine. She is able to relieve the technician from time to time, which makes it possible to maintain some physical medical service throughout a twenty-four hour day.

The general procedure in the management of cases for the physical medicine department is as follows: Examination, diagnosis and prescription by the physician are carried out in the plant health department and recorded on the dispensary record. The patient then is referred to the physical medicine department. If no further details as to the prescription are necessary, the required treatment is instituted. A physical medicine record is made active and the patient's visit recorded on the daily schedule. The practice of giving the patient a definite appointment for each subsequent visit has been found highly successful. This plan of action allows for adequate and proper treatment with a minimum of friction and loss of time at the work station. Moreover, it enables the factory to continue its work uninterrupted and allows the physical medicine department to operate with maximum efficiency.

The progress of the patient under treatment is closely observed by the medical and technical staffs. When the physician decides, after examination, that the treatments should be altered or discontinued, this fact is noted on the physical medicine record.

Often in the opinion of the examining physician a patient is not able to carry on his regular work. A "special work" form is then executed, stating the patient's exact limitations and requesting that he be placed on "spe-

Physical Therapy Department Statistics from June, 1943 to June, 1944 *

Diagnosis and Location	No. of Cases	Prescription: Hydro	Mechano	Electro	Light	Thermo	No. of Visits	Occupational	Nonoccupational	No. of Days Duration
Strains and Sprains —										
Neck	8	....	3	....	....	8	20	4	4	29
Chest	9	....	4	....	....	9	39	6	3	52
Abdominal and inguinal region	8	1	2	....	....	8	46	5	3	80
Shoulder	50	....	25	6	....	49	573	38	12	1,112
Back —										
Thoracic	34	....	18	3	....	33	285	30	4	485
Lumbar	93	....	78	3	....	93	1,104	76	21	2,165
Lumbosacral	22	....	22	3	....	20	386	18	4	788
Sacroiliac	20	....	15	2	....	20	258	16	4	389
Coccygeal	2	....	1	....	....	2	7	1	1	8
Arm	30	8	15	5	....	23	350	21	9	666
Elbow	10	4	4	2	....	7	112	5	5	210
Forearm	18	6	6	2	....	13	134	14	4	215
Wrist	59	47	40	2	....	15	674	40	18	1,213
Hand	12	12	6	2	....	4	155	8	4	237
Fingers	23	20	12	2	....	6	319	20	3	601
Hip	2	....	2	....	....	2	14	2	....	20
Thigh	5	....	3	1	....	4	19	5	....	73
Knee	25	4	18	6	....	19	272	16	10	614
Leg	8	3	4	....	....	5	21	3	5	30
Ankle	41	37	23	....	....	4	203	23	18	367
Foot	17	17	10	....	....	1	103	11	6	242
Total	496	159	311	39	....	345	5,094	362	138	9,596
Dermatitis —										
Upper extremities	92	88	....	....	7	2	435	77	15	1,328
Lower extremities	36	35	....	....	2	....	106	19	17	156
Lower extremities and trunk	6	6	....	....	....	....	14	5	1	23
Upper extremities and trunk	11	10	....	....	1	....	46	8	3	78
Trunk, face and generalized	15	6	2	1	5	4	84	11	4	170
Total	160	145	2	1	15	6	685	120	40	1,655
Contusions —										
Upper extremities	72	44	28	6	....	33	839	68	4	1,976
Trunk and head	24	....	5	....	....	24	193	22	2	480
Lower extremities	79	47	31	....	....	34	453	76	3	764
Total	175	91	64	6	....	91	1,485	166	9	3,220
Myositis and Myalgia —										
Neck and shoulder	67	....	54	3	....	66	394	5	64	725
Back and chest	76	....	70	4	....	75	541	16	59	1,000
Upper and lower extremities	15	4	8	1	....	10	70	4	11	116
Abdomen	1	....	1	....	....	....	1	....	1	1
Total	159	4	133	8	....	151	1,006	25	135	1,842
Sinusitis	4	....	....	4	....	2	21	....	4	33
Infections	35	35	....	....	....	2	143	12	23	292
Burns	29	26	....	1	4	1	206	28	1	722
Fractures	14	11	10	....	....	3	183	10	1	343
Arthritis	16	2	11	4	....	13	271	3	13	477
Neuritis and neuralgia	18	5	8	6	....	11	220	4	14	584
Lacerations	13	12	10	....	....	2	180	12	1	280
Bursitis	18	2	12	7	....	11	427	8	10	839
Abrasions	9	6	....	1	....	2	32	9	....	95
Tenosynovitis	6	4	5	1	....	1	63	5	1	88
Puncture wounds	6	6	....	....	....	....	11	6	....	12
Miscellaneous	64	34	20	10	6	18	1,097	24	40	2,121
Grand total	1,220	542	585	88	25	659	11,124†	794‡	430§	22,153

* These statistics were taken from closed cases.

† Approximately 15 to 20 per cent of the total number of visits were nonoccupational.

‡ In all occupational cases the patient was cured or discharged as symptom free.

§ In most of the nonoccupational cases the patient was cured or, when prolonged treatment was indicated, was referred to the family physician.

cial work" for which he is better adapted. This form is addressed to his foreman, who then adjusts his job to fit the existing disability. Correctly handled, this program can function as a form of occupational therapy.

When a definite incident has caused a worker's disability, the plant physician executes an "accident report request" which is sent to the foreman in charge of the injured worker. A copy of this report is made for the safety department, which in turn investigates and corrects the cause of the accident.

In all cases except a few very minor ones, the treatments are discontinued and the case closed only after examination by the physician.

It has been demonstrated that intelligent medical guidance and conscientious administration are necessities in keeping this physical medicine department from being a catch-all for malingerers and "compensation neurotics" or an appeasement center for the maladjusted. To avoid such a situation, it is important that the physician refer a worker to the department only for specifically prescribed therapy of a diagnosed disorder. To do otherwise must be considered poor judgment on the part of the physician and a waste of the time of the technician. Moreover, it uselessly ties up equipment and seldom produces the desired results. It promotes malingering and may develop in the worker a pernicious habit of needless visits and accentuate his neurosis.

The various modalities available in a well equipped department each have well defined uses and should be prescribed for those uses. There is active and there is passive exercise and there is equipment to give support and physiologic rest. Each modality should be used purposefully for its specific effect and not merely because it is there or as a convenient means of doing something for a problem patient. Futile therapy undermines morale, and the neurotic, the malingerer and the malajusted are often adept in taking advantage of such treatment for their own purposes:

Some of the outstanding advantages of having a physical medicine department in an industrial medical service may be enumerated as follows:

1. It greatly extends and reinforces the armamentarium of the industrial physician.

2. The workers are provided with better medical service, which reduces the convalescent period in the case of many traumatic injuries and obviates hospitalization in others.

3. The work of this department relieves an overcrowded dispensary of such measures as soaks, thermal or neutralizing baths and wet dressings for chemical burns, which rightly belong in the physical medicine department.

4. In the general rehabilitation program of this organization, the physical medicine department has an important functional part. It is utilized for electrodiagnostic procedures, which are being performed in accordance with the latest improved technics,[4] and the suitable placement of physically handicapped persons is taken care of by the "special work" program discussed.

The physical medicine department in this plant has thus proved a valuable asset to the whole medical program. That it also has justified itself financially we have shown in a previous paper.[5] Later statistics show that, during the third quarter of 1944, 1,706 treatments were given to patients with occupational injuries. The estimated cost of sending such patients to an outside clinic is approximately $3.50 per treatment or $5,970. This does not include the cost of lost man-hours, disruption of work schedules or the expense of transporting patients to outside clinics. The approximate cost of operation

4. Osborne, M. S.; Stafford, L., and Holmquest, H. J.: Technic of Electrotherapy, Springfield, Ill., Chas. C. Thomas, 1944.

5. McMorris, R. O., and Carlisle, J. M.: Physical Medicine in Industry, Indust. Med. 13:679 (Sept.) 1944.

of the physical medicine department over the same period was $1,900. These figures show an apparent saving to the company of $4,071.

In addition to occupational injuries, 660 minor non-occupational ailments have been treated during this period, representing an estimated saving to the employees of $2,283. This is an important item to an industiral firm that is interested in the morale and welfare of its workers. Moreover, in receiving prompt and skilfully applied physical therapy, the employee has incontrovertible proof, through his own personal experience, that the management takes a real interest in his comfort and well-being. The practical-minded worker generally is more favorably impressed when something actually is being done for him than when he is merely being advised.

Industrial management is necessarily interested in efficiency of operation, and in considering any plan for installing a physical medicine department, it naturally will balance costs against expected benefits. The facts and figures we have presented make it clear that such a department can be operated at a profit. They also show that in this instance management, recognizing its value, has fully supported a physical medicine department in its rapid growth from very small beginnings—a growth of 400 to 500 per cent in three years. War shortages have imposed difficulties in obtaining certain types of equipment and supplies and have prevented an even greater development of this important branch of industrial medicine.

OBSERVATION ON HAND INJURIES *

Dr. Sterling Bunnell, a civilian consultant to the Secretary of War, visited a number of general hospitals in United States during December, 1944. His observations made in these installations should be of interest to all medical officers. Dr. Bunnell stated in a letter to The Surgeon General that he examined about seventy hand cases in each hospital. There were many more of which too many showed the following:

1. Malunion of phalanges and especially metacarpals showing zigzag positions of fragments and overlapping due to lack of early traction. There were also rotation deformities and shortening.
2. In most cases, the proximal finger joints were stiff and straight. When fixed in this position they cannot be flexed due to shortening of their collateral ligaments. This is usually preventable by early traction in flexion and early exercise in flexion.
3. Often all the joints of the hand were stiffened from splinting too much of the hand, not keeping the digits moving and splinting for too long a time. Many were from banjo splinting with fingers and palm straight instead of curved.
4. Almost all wrists in plaster of paris were in the straight position instead of dorsiflexed.
5. Hands were usually not in the functionating position—namely, with wrist dorsiflexed, proximal finger joints flexed, and the thumb opposed. Some of these were from muscle imbalance due to nerve injury, but were unsplinted.
6. Many hands were too greatly indurated and with large scars and flexion contractures from not having been closed over early by skin grafts.

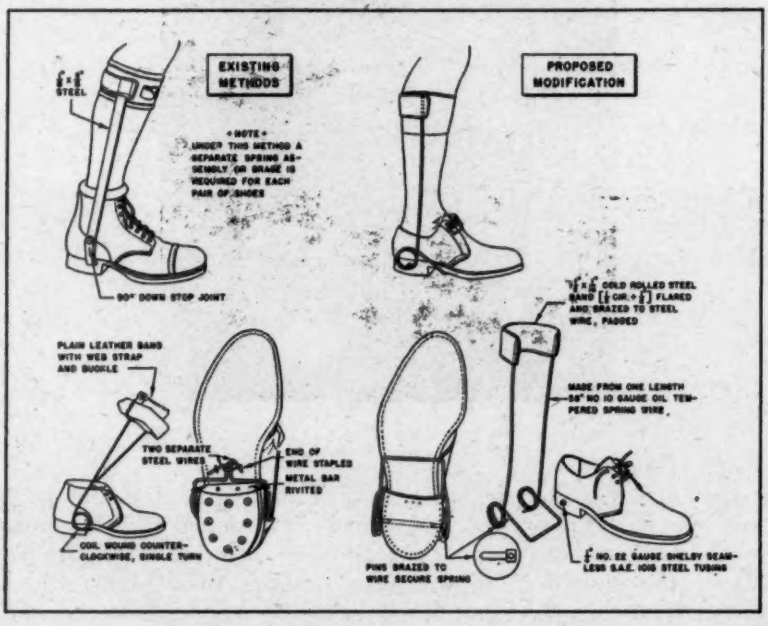
Splints with which the joints may be drawn into position for function such as the wrist into dorsiflexion, the proximal finger joints into flexion; and the thumb into opposition, etc., should be made in local brace shops. With plaster of paris, castex, or metal, a splint can be made to correct the deformity of median and ulnar nerve palsy. For radial nerve palsy the light Oppenheimer wire spring splint seems desirable as it is cheap and easy to make, fits through a coat sleeve, checks only the joints desired, and allows free movement of the muscles, tendons, and joints in forearm and hand. For small miscellaneous splints for digits, strips of inexpensive vineylite sheets held over a Bunsen burner may be quickly fashioned as desired.

* Reprinted with permission, Bull. U. S. Army M. Dept. 86:4 (March) 1945.

Joints and stiff hands loosen up better under actual use than by passive physiotherapy. Though heat is beneficial for the short time a day that it is given, rough manipulation of finger joints is harmful, and lights and electricity of very doubtful value. Occupational therapy, on the other hand, actually gives good results, and I believe should be encouraged. Various wooden blocks with holes which place fingers in desired positions are used for sandpapering. These are excellent and also the various occupational procedures placing each man in the occupation which will be beneficial for his hand. Valley Forge General Hospital has an especially good department of this type, as have some of the other hospitals.

DROP FOOT BRACE *

Two types of drop foot brace are in common use: (1) the metal brace with a drop lock ankle. This brace is cumbersome and lacks a spring. (2) The standard wire brace has a spring at the ankle. In this brace, the wire bends and may need replacement. A modification of the latter spring has been designed by Jack R. Pava, orthopedic mechanic, Hoff General Hospital, Santa Barbara, California, in which the upright is placed in front of the coil rather than behind it. Thus the weight of the foot compresses the spring instead of opening it, increases its efficiency, and minimizes the need for replacement due to relaxation of the spring or breakage.


EXISTING METHODS
PROPOSED MODIFICATION
90° DOWN STOP JOINT
PLAIN LEATHER BAND WITH WEB STRAP AND BUCKLE
TWO SEPARATE STEEL WIRES
END OF WIRE STAPLED METAL BAR RIVETED
COIL WOUND COUNTER-CLOCKWISE, SINGLE TURN
MADE FROM ONE LENGTH 56" NO 10 GAUGE OIL TEMPERED SPRING WIRE
PINS BRAZED TO WIRE SECURE SPRING

The splint as modified may be worn with different pairs of shoes, being adjusted to a new pair after drilling a hole ¼ inch in diameter through the heel of the shoe and inserting a metal tube. This does away with the need for multiple braces and is particularly desirable in cases with bilateral involvement. It also does away with the need for nailing or riveting the crosspiece to the sole of the shoe.

Placing a half metal band around the calf of the leg between the uprights provides comfort and does away with the flexible strap and buckle around the anterior part of the leg, which may allow the brace to twist around the calf. With the half metal band placed posteriorly, the steel uprights remain parallel and lateral to the leg and give even tension to the foot in neutral position.

* Reprinted with permission, Bull. U. S. Army M. Dept. 86:28 (March) 1945.

DEVICE FOR ROTATORY MOVEMENTS OF THE FOREARM *

The vast majority of war wounds comprise compound injuries of the extremities. Among this group is an increasing number of fractures and derangements of the upper extremity which will result in restricting rotatory movements of the forearm. In spite of the frequency of impairment of pronation and supination of the forearm, it is often underestimated or even overlooked. Much more emphasis appears to be given to extension and flexion of the elbow, one reason for which is that few physical therapy departments have a proper device for rotatory motion of the forearm. Captain Joshua Ehrlich, M.C., A.U.S., has made an inexpensive device for this purpose (figure 1).

The patient faces the device with his hand grasping the handle and with elbow bent at 90 degrees. The arm is maintained in full adduction by patient's other arm or strapped to the body in order to eliminate any other movement of the shoulder. The device consists of a plank which slides vertically between two pieces of wood and two wooden wheels of different diameter. The larger thinner wheel is fixed to the plank and is graded from 0 to 180 degrees to the left and from 0 to 180 degrees to the right of the vertical line crossing the center of this wheel. The smaller wooden wheel, which is thicker, is grooved and possesses a handle which can be turned around. Through the center of both wheels is a bolt which holds them to the plank. To the smaller wheel, a cord is fixed in such a way that when it is turned the cord is placed in the groove. The plank can be regulated in relation to the height of the patient.

* Reprinted with permission, Bull. U. S. Army M. Dept. 87:25 (April) 1945.

PHOTOGRAPHIC RECORD OF JOINT MOTION *

MAJOR GEORGE D. WILSON

and

PRIVATE WILLIAM H. STASCH

Medical Corps, Army of the United States

The overcoming of restriction of joint motion due to long periods of immobilization and to pathologic changes has resulted from refined physical therapy methods. Witnessing the return to function of many severely wounded joints in the department of physical medicine of the Oliver General Hospital stimulated development of a photographic method of recording the improvement.

Bullet or shrapnel wounds in and about the important joints of the upper and lower extremities, with consequent development of fibrous tissue among the periarticular tissues, are responsible for a great percentage of such restriction of motion. In our department, besides making a notation on the clinical record of the improvement in joint motion in degrees, we include a photographic record made according to the method to be described.

A double exposure is made with a speed graphic camera, 4 by 5 Ektar 4.7 lens, with exposure time of one-tenth second, aperture f.11, on triple S Ortho Ansco film. One exposure is made with a goniometer, representing the angle of greatest extension, and a second exposure is made to show the

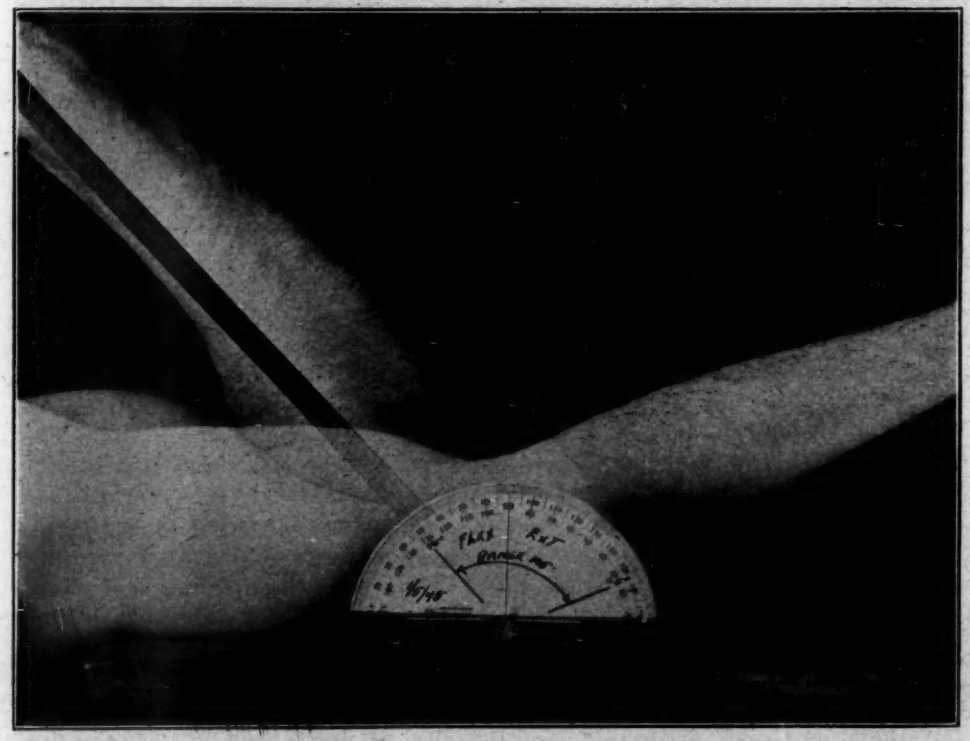


Fig. 1. — Photographic record of the motion of the elbow joint after physical therapy in a case of myositis ossificans secondary to fracture of the head of the radius.

* From the Department of Physical Medicine, Oliver General Hospital, Augusta, Ga. Major Wilson is chief of the Department of Physical Medicine. Private Stasch is attached to the Photographic Section.

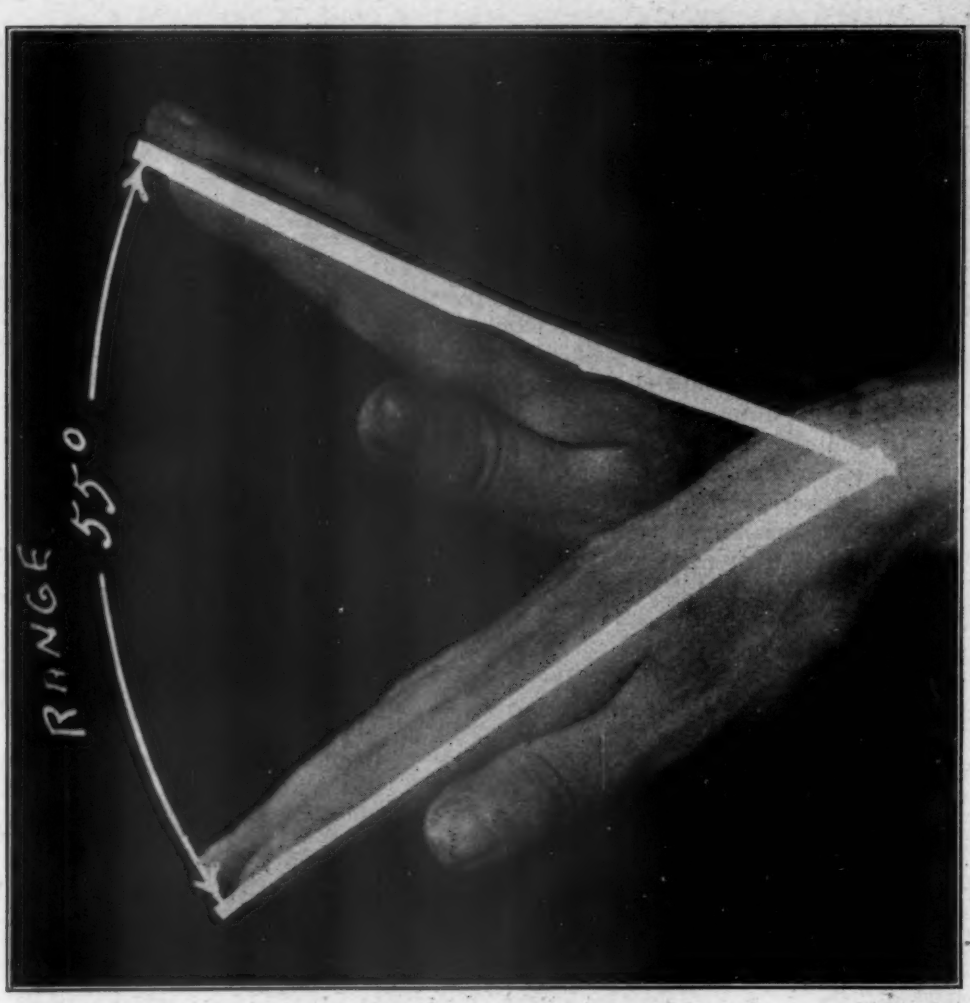


Fig. 2. — Photographic record of the motion of the wrist gained through physical therapy after a bone peg graft for nonunion of a fractured carposcaphoid bone.

angle of greatest flexion. This double exposure (fig. 1) reveals the voluntary range of motion of the joint. The negative is developed in Agfa 17 at twenty minutes, temperature 68 F., black background.

This method has proved to be an invaluable aid in determining the motion of the wrist, the metacarpal-phalangeal and the phalangeal joints. The range of motion of these joints is difficult to determine accurately with the goniometer alone.

When a goniometer is not used in combination with the photographic method, the range of motion may be determined on the developed print by running two straight lines from the axis of the joint and measuring the angle of the range of motion with a protractor. Two very thin strips of masking tape may be applied on the negative over the parts to be measured, as shown in figure 2. White ink is used for writing on the negative.

This photographic method has been found not only practical for recording the range of joint motion and the clinical improvement but, through reproduction of the double exposure negative on a lantern slide or print, valuable as a visual aid for teaching purposes. False joint motion or motion from pseudoarthrosis may be detected by the method.

ARCHIVES of PHYSICAL MEDICINE
OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL MEDICINE

EDITORIALS

FINAL FREQUENCY ALLOCATIONS GRANTED BY FEDERAL COMMUNICATIONS COMMISSION

The Federal Communications Commission on May 17, 1945 announced its final frequency allocations to the non-governmental radio services in the portion of the spectrum between 25 and 30,000 megacycles with the exception of the 44 to 108 megacycle region of the spectrum, which is left unassigned at this time pending the outcome of measurements and tests of FM transmission during the coming summer.

These allocations will probably be ordered into effect service by service, with the Commission taking into account such factors as the availability of manpower and materials, the results of the Inter-American conference at Rio, and the preparation of the Commission's rules and standards. Of course, any allocations made by the Commission are subject to being changed to conform to the provisions of international agreements.

The band in the 27 megacycle region available for scientific, industrial and medical devices, including diathermy machines, was enlarged in accordance with the recommendation of the manufacturers of diathermy machines, from the 30 kilocycle channel width assigned in the proposed report to 270 kilocycles. The other allocations for the scientific, industrial and medical devices were left unchanged. That is to say, medical, industrial and scientific services now stand to have three wavelengths assigned to them, the 13.660 megacycle region and the 40.980 megacycle region, having a band width of ± 0.05 per cent and the 27.320 megacycle region having a band width of ± 0.5 per cent.

PSYCHOTHERAPY IN PHYSICAL MEDICINE

The valuable aid which the physical therapy technician may render in the care of the psychiatric or psychoneurotic patient was discussed by Solomon.[1] This author pointed out that the physical therapist does not have to be a psychiatrist to be very helpful in the care of these patients. Physical therapy has a definite psychotherapeutic value aside from its influence on physiologic processes. The patient feels that he is the object of interest and attention. The patient-technician relationship provides excellent opportunities for helpful suggestion and persuasion.

The author advocated that the psychiatrist even write actual psychiatric prescriptions for the guidance of the physical therapy technician. Patients who feel themselves unloved and rejected should be given the utmost care and attention. Some patients may present symptoms which represent unconsciously a rationalization for care, attention, interest, and sympathy; they should be treated with as much consideration as they would if the difficulty were really organic in nature. Other patients may prefer to be dominated

1. Solomon, A. P.: Rehabilitation: Opportunities for Psychotherapy in Physical Therapy, Occup. Therapy 22:286 (Dec.) 1943.

or led; they should be treated with authority in an endeavor to stimulate more aggressive attitudes. Certain patients whose symptoms are not of organic origin sense that they are not, and are therefore sensitive on the point. The technician should avoid any implication that the patient is malingering. Patients who have been seriously crippled and fear the adjustment to new situations on discharge, should be encouraged and reassured. If the physical therapist is made aware of these conditions and is advised by the psychiatrist on how to handle them, she can be an even greater help in the rehabilitation program.

In his article in the present issue of the ARCHIVES, Knudson[2] stresses the value of physical medicine as an important part of the program for the rehabilitation of patients suffering from the war neuroses. In fact, experience has "shown incontrovertibly the absolute necessity for the use of physical methods of treatment as the first line of attack on the really acute neuroses of recent origin and the value of these methods of treatment to remedy aggravation of even chronic neurotic states." If physical therapy technicians who are handling these patients could be psychiatrically conditioned as suggested by Solomon, results should be even more satisfactory.

2. Knudson, A. B. C.: Physical Medicine in the Rehabilitation of Patients with War Neuroses, Arch. Phys. Med. 26:336 (June) 1945.

PHYSICAL MEDICINE IN INDUSTRY

In this issue of the ARCHIVES will be found an article by Carlisle and McMorris[1] on the employment of physical medicine in industry. The authors describe the development of a physical medicine department in a plant employing 2500 persons. In a floor space of 600 square feet 2366 patients were handled in one quarter of 1944. It was estimated that this compact unit saved the company $4,071.00 in treatment costs for its employees in this three months period. Not only so, but the department is an evidence to the employee that the management takes a sincere interest in his welfare and this helps to promote harmonious relations between them.

The work in the physical medicine department just described is directed by a registered physical therapy technician who is assisted by graduate nurses. Medical supervision is furnished by members of a medical staff who hold regular conferences concerning the treatment and progress of the patients.

If every factory of any considerable size in the United States were to follow the pattern outlined above, the demand for trained personnel would far exceed the present supply, and, in fact, would do so for some years to come. Yet such an expansion is desirable and doubtless will develop as qualified physicians and technicians become available. The greater demand will be for technicians and this fact sets a task for the physical therapy schools which are not even able to meet the present military and civilian demands. Since the very nature of the training given technicians necessitates relatively small classes, the obvious need will be for expansion of the training program.

1. Carlisle, James M., and McMorris, Rex O.: Physical Medicine in Industry, Arch. Phys. Med. 26:353 (June) 1945.

MEDICAL NEWS

Major Kendell Director Mississippi State Fever Therapy Unit

The unit is located at the Brookhaven Public Health Treatment Center, Brookhaven, Mississippi, and is so arranged that there will be four 6-bed wards to accommodate both colored and white, male and female. In direct connection with the patient wards are six fever treatment rooms, fully equipped with the latest type of cabinets. The personnel will consist of the Medical Director and a complete staff of specially trained nurse technicians and staff nurses.

The law specifically charges the County Health Officers with the responsibility of referring patients from both public clinics and private physicians. Every effort will be made by the entire staff of the State Fever Therapy Unit to cooperate with the County Health Officers and the private physicians by rendering consultation service and by administering fever-chemotherapy to those patients who fulfill the requirements for admission.

Those patients with asymptomatic neurosyphilis with type III spinal fluid are prone to develop the more serious manifestations of neurosyphilis, particularly paresis. Therefore, at the beginning, this group of patients will be selected for treatment at the State Fever Therapy Unit, which also fulfills the stipulated purpose by law.

Educational Opportunities for Army Doctors

Since the start of World War II, over 6,000 selected medical officers have been graduated from short but intensive courses given by the Medical Department in some thirty critical medical and surgical specialties, according to Major General George F. Lull, Deputy Surgeon General. In addition, refresher courses in general medicine and surgery provide medical officers with a chance to "brush up" before returning to professional assignments after other duty.

In the post war period, he added, all doctors will be entitled to professional training, after their release from service, under the G. I. Bill of Rights, and those who remain in the Army will have the opportunity for refresher training at selected military hospitals and civilian schools.

Colonel Thorndike Attends Canadian Conference

At the invitation of the Director General of Medical Services of the Canadian Army, Colonel Augustus Thorndike, MC, Director, Reconditioning Consultants Division, Office of The Surgeon General, attended a conference on Convalescent Conditioning Centers last month. Colonel Thorndike reports that the Canadian Conditioning Centers are much like those in the United States, stressing a combination of physical, educational and occupational therapy, but that patients treated at these centers are mainly training casualties, most of the returned battle casualties in Canada being under the jurisdiction of what corresponds to our Veterans Administration.

Postgraduate Course in Physical Medicine

The committee on postgraduate education of the Medical Society of the District of Columbia opened a three lecture course in physical medicine, April 9, with a talk by Francis O. Schmitt, Ph.D., head of the department of biology and the department of biologic engineering of the Massachusetts Institute of Technology, Cambridge, on "The Physical Basis of Physical Medicine." Dr. Frank H. Krusen, head of the section on physical medicine, Mayo Clinic, Rochester, Minn., gave the second lecture, April 16, on "The Future of Physical Medicine," and Dr. George M. Piersol, director, division of physical medicine, and professor of medicine, Medico-Chirurgical College, Graduate School of Medicine, University of Pennsylvania, Philadelphia, gave the third lecture, April 23, on "Clinical Aspects of Physical Medicine."

District Medical Society Honors Gen. Ireland

Major General Merritte Weber Ireland, U. S. A., retired, who modernized the Army Medical Department when he became Surgeon General after World War I, received his second honor of the year this month: a citation awarded by the Medical Society of the District of Columbia for distinguished services to humanity and military medicine.

Cerebral Palsy Program

A meeting was held in Columbus Ohio, March 20, called by Ralph W. Holmes, M.D., chairman of the Committee on Cerebral Palsy for the Ohio Society for Crippled Children. The membership of the Committee on Cerebral Palsy under the chairmanship of Dr. Holmes includes among others, representatives from the board of directors of the Ohio Society, the Division of Special Education of the State Department of Public Education, State Services for Crippled Children.

Father Schwitalla Named Moderator of Physicians' Guilds

Rev. Alphonse M. Schwitalla, S.J., president of the Catholic Hospital Association and dean of the St. Louis University School of Medicine, St. Louis, has been named moderator of the Federation of Catholic Physicians' Guilds and editor of the federation's journal, the *Linacre Quarterly.*

Opportunity for Physical Therapists

Major General Norman T. Kirk, Surgeon General of the Army, and Vice-Admiral Ross T. McIntire, Surgeon General of the Navy, declared that the return of the wounded from many fronts was intensifying the shortage of physical therapists and urged young men and women throughout the nation to avail themselves of the scholarships offered by The National Foundation for Infantile Paralysis which has appropriated $1,267,600 for a physical therapy program. Applications for scholarships are being accepted at the National Foundation's offices, 120 Broadway, New York 5, N. Y.

General Kirk stated that the rehabilitation of the wounded, in which physical therapy is of increasing importance, would continue long after the war is over and that the expansion of the scope of physical therapy to "new fields of usefulness" would increase the postwar need for trained personnel.

Admiral McIntire reported that Navy and Marine Corps medical officers "have come to consider properly applied physical therapy as much a part of the treatment of these (war wounded) cases as good surgery." He declared that postwar physical therapy would not only help repair the human damage of the war but "also help overcome the less dramatic but none-the-less serious casualties of every day peace time life."

General Kirk's and Admiral McIntire's endorsements of the National Foundation's physical therapy training program were made public by Basil O'Connor, president of the National Foundation, who pointed out that students who accepted the scholarships were not required to limit their work to infantile paralysis patients on completion of the nine and twelve months courses.

General Kirk's statement follows:

"The appropriation of $1,267,600 by The National Foundation for Infantile Paralysis for the training of physical therapists is a most timely project and one which will undoubtedly meet with a gratifying response.

"In the rehabilitation of the wounded soldier, it is the function of the Medical Department of the Army to restore his health, regiment his spirit, and assist him to meet the problems imposed on him by his handicap. Physical therapy is an important part of this program. By means of its application, the period of the soldier's convalescence is frequently shortened, and his return to duty is expedited. The interest and encouragement offered by the physical therapist are important factors in facilitating the psychological readjustment of these men.

"Although the opportunity for service which is offered in the field of physical therapy is more keenly appreciated during time of war, it is in no way limited to the present emergency. The work of rehabilitation will continue long after the war is over. For physical therapists in Army and Veterans installations, the termination of the war merely marks the beginning of a second chapter in this job of reconstruction. With the expansion of the scope of physical therapy, new fields of usefulness will require increased personnel. The outlook for the future in this profession is a most promising one."

The immediate need in the armed forces is so urgent, the General said, that the Army is also conducting its own training courses in Army general hospitals.

Vice-Admiral McIntire's statement follows:

"It has been a source of satisfaction to me to know of the program for general development in the field of physical therapy and for training teachers and workers which the Foundation has established and financed.

"As the wounded have been returned from the many fronts on which the Navy and Marine Corps are actively engaged, there has been an increasing demand upon our physical therapy departments. Our medical officers have come to consider properly applied physical therapy as much a part of treatment of these cases as good surgery. Some of the wounds do not differ materially in the treatment they require from the injuries of every day civilian life. After the war is over those casualties of peace will continue to occur and good medical practice will demand the same use of physical therapy as is proving of inestimable value in treatment of the casualties of war.

"Wide dependence on physical therapy as an essential part of the treatment of wounds has stimulated interest in its application in many other conditions. Now, instead of physical therapy being looked upon as an adjunct to orthopedics, it has become an important therapeutic procedure for the hospital as a whole.

"The place of physical therapy as an essential part of the general practice of medicine is becoming daily more firmly established as its value is being demonstrated in the hospitals of the Armed Services.

"The increasing use of physical therapy which can be foreseen in the future will call for many qualified therapists. Young women who have the desire for a professional career of aid to the injured or afflicted should find in physical therapy a field of endeavor in which they can not only participate in the repair of the human wastage of the war, but also help overcome the less dramatic, but none-the-less serious, casualties of every day peace time life."

Major Vogel Addresses PT Graduates

Major Emma E. Vogel, PT, Director of Physical Therapists, Office of The Surgeon General, addressed the graduating class of physical therapists who received their commissions as Second

Lieutenants at Walter Reed General Hospital this month. In telling about her recent inspection trip in the European Theater, she said, "It is my belief that the most important function of physical therapists in our overseas hospitals is to demonstrate to the medical world the value of early exercise and static contraction of muscles to prevent atrophy and deformity."

Workshop in Health Education

A workshop in Health Education and an Institute on Orthopedic Nursing will be offered by the Frances Payne Bolton School of Nursing of Western Reserve University, Cleveland, Ohio, June 18-July 6: the Workshop being held from June 18-July 6; the Institute from June 16-29.

The courses are open to graduate nurses, especially those interested in public health nursing, school and industrial nursing, supervisors and teachers in schools of nursing and nurses in out-patient departments and clinics. For further information write School of Nursing, Western Reserve University, Cleveland 6, Ohio.

Legislation

In the State of Illinois, H. 389 introduced, proposes to enact a separate chiropractic practice act respecting the examination and licensing of applicants for licenses to practice chiropractic. H. 397 proposes to revise the law relating to the commitment, detention and care of mentally ill persons and to provide for the licensing and regulating of private institutions for the care of such persons.

In the State of New Jersey, there was introduced a bill, A. 380, which proposes to enact a separate naturopathic practice act and to create an independent board of naturopathic examiners to examine and license applicants for licenses to practice naturopathy.

S. 180 introduced in the legislature of the State of New Jersey proposes to enact a separate chiropractic act and to create an independent board of chiropractic examiners to examine and license applicants for licenses to practice chiropractic, defined in the bill as "the philosophy, art, science and practice of things natural; a system of adjusting the articulations of the spinal column and adjacent tissues by hand only for the correction of the cause of disease." Such a license, the bill proposes, would authorize the holder thereof to "examine patients and to diagnose and adjust for any interference with the transmission of nerve energy and to prescribe or regulate the patients' dietary, sanitary and hygienic requirements; also to use the Neurocalometer, x-ray and any other instrument for the purpose of diagnosis or analysis only, and such licensee shall have the right to employ nurses and assistants."

H. 284, a bill introduced in the legislature of the State of Ohio proposes to enact a separate chiropractic practice act and to create an independent board of chiropractic examiners to examine and license applicants for licenses to practice chiropractic. H. 224, to supplement the medical practice act, proposes in effect to require the board of medical examiners to issue without examination a license to practice naturopathy to any resident who at the time of the passage of this bill is licensed to practice naturopathy in any other state. The bill further proposes to require the board to examine any person who holds a degree of Doctor of Naturopathy and who applies for a license.

H. 979, a bill introduced in the legislature of the State of Pennsylvania proposes to enact a separate chiropractic practice act and to create an independent board of chiropractic examiners to examine and license applicants for licenses to practice chiropractic, defined as "the science of palpating and adjusting the articulations of the human spinal column." H. 1022 proposes to enact a so-called animal research act and to establish a board to license and regulate the sale, use, distribution and disposition of live animals for teaching, scientific study, research and experiment.

S. 193, introduced in the legislature of the State of Rhode Island, proposes that there shall be no discrimination made by any state department for or against any school of practice of the healing art in any medical plan which involves the expenditure of state funds.

In the State Legislature of Missouri there has been introduced bill, H. 250, to amend the osteopathic practice act, which proposes to make it unethical conduct, for which a licentiate's license may be revoked, for a licensed osteopath "to fail to designate him or herself as osteopathic physicians or osteopathic surgeons or osteopathic physicians and surgeons." S. 89 proposes so to amend the narcotic drug act as to include isonipecaine within the meaning of the term "narcotic drugs" as used in the act.

In the Legislature of the State of Massachusetts, bill H. 1738 has been introduced which proposes to enact a separate chiropractic practice act to create an independent board of chiropractice examiners to examine and license applicants for licenses to practice chiropractic. The bill proposes to define chiropractic as "the science of locating, and removing, by hand only, interference with the transmission or expression of nerve force in the human body, and the correction of misalinement or subluxations of the vertebral column. It excludes operative surgery, prescription or use of drugs or medicine or the practice of obstetrics, except that the x-ray may be used solely for the purpose of examinations."

In Congress H. Res. 206 has passed the House providing an additional appropriation not to exceed $15,500 to enable the Committee on Labor to continue its investigation of the extent and character of aid now given by the federal, state and local governments and private agencies to the physically handicapped.

Postgraduate Medical Clinic on Poliomyelitis

Dr. Edward A. Piszczek, director of the Cook County Public Health Unit, Chicago, and Gustav Valdemar, director of physical therapy, Children's Hospital, Denver, conducted a postgraduate medi-

cal clinic on poliomyelitis March 17-25 under the auspices of the Kansas Medical Society, the state board of health and the University of Kansas School of Medicine, Lawrence-Kansas City. The course was conducted two days each in Kansas City, Parsons, Salina, Wichita and Topeka. The general topics of basic knowledge of infantile paralysis, diagnosis of poliomyelitis and treatment were discussed from medical and physical therapeutic aspects. The speakers were furnished at the request of the state board of health by the National Foundation for Infantile Paralysis.

Full Quota of Occupational Therapy Students Enrolled

Army emergency courses for occupational therapists will be terminated as soon as those already scheduled for June and July have been completed, according to Mrs. W. C. Kahmann, Chief of the Occupational Therapy Branch of the Reconditioning Consultants Division, Office of The Surgeon General. The courses were initiated last year to overcome a serious shortage of occupational therapists in Army hospitals, she explained, but the full quota of students—700—has now been enrolled.

Colonel Cook, Director of Occupational Health Division

Lieutenant Colonel William L. Cook, Jr., MC, has been assigned as Director of the Occupational Health Division, Preventive Medicine Service, Office of The Surgeon General, succeeding Colonel Anthony J. Lanza, who was recently retired from active duty.

Colonel Cook received his M.D. degree from the Columbia University College of Physicians and Surgeons in 1934. At the time he entered the Army in 1942, he was engaged in private practice in Pittsburgh, Pa., specializing in internal medicine and cardiology, and was medical consultant for the Westinghouse Electrical and Manufacturing Company of that city.

Seminar for Rehabilitation Personnel

The National Tuberculosis Association announces quarterly seminars for the orientation of rehabilitation personnel by means of a three week period of lectures and panel discussions. There will be offered a week of group visits to official and unofficial agencies such as sanatoria, tuberculosis associations, state rehabilitation offices, workshops and social service facilities. Inquiries concerning this service should be forwarded through state tuberculosis associations to the Program and Personnel Service of the National Tuberculosis Association.

Frank Allen Dies

The National Society for Crippled Children as well as friends and associates were shocked to learn of the death of Frank B. Allen in Florida on April 8 from a heart attack. Mr. Allen was 57.

Mr. Allen has been actively interested in the crippled children movement, which was founded by his father, Edgar F. "Daddy" Allen, since illness forced "Daddy" Allen to retire from the presidency of the Society in 1934 and pass on the torch to Paul H. King.

Proposed Medical Center

The construction of a giant medical center, part of the plans for which had been previously announced, to be undertaken cooperatively by New York City and New York University in the Bellevue Hospital area, will begin as soon as materials are available, according to Mayor Fiorello H. La Guardia in the New York *Times*, March 19. The mayor is said to have estimated the cost of creating the new model center at $27,500,000, of which $12,500,000 would be the city's share.

Storm Over Veterans Administration Medical Care

The Subcommittee on Wartime Health and Education of the Committee on Education and Labor of the United States Senate has issued a report on the health needs of veterans. The committee points out that criticisms of the quality of service given by the Veterans Administration have been made by organizations and individuals who speak authoritatively. It is emphasized that the personnel classifications and salaries for physicians, nurses and social workers are not sufficiently high to attract the best practitioners and workers. The hospitals of the Veterans Administration are likely to be isolated geographically and medically. Although the administrator has full authority and adequate funds to avail himself of the very highest quality of consultation and part time services of leading physicians, the utilization has been minimal. In a published article attention has been called to the low quality of rehabilitation available for men with surgical disabilities.

Conference Talks at Institute of Living

The Institute of Living of the State of Connecticut has opened a ten week series of conference talks on neurology, psychiatry and allied sciences. "Physics and Technology in the Development of Physical Medicine was the subject of one of the lectures given by Francis O. Schmitt, Ph.D., Cambridge, Mass.

"Physical Therapists" Published by Department of Labor

"Physical Therapists" is the title of Bulletin 203, No. 1, issued recently by the Women's Bureau of the United States Department of Labor. It is one of a series discussing the outlook for women in occupations in the medical services. It is for sale, price 10 cents, by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

BOOK REVIEWS

DOCTORS AT WAR. Edited by *Morris Fishbein*, M.D., Editor of *The Journal of the American Medical Association* and of *Hygeia;* Chief Editor of *War Medicine* and Chairman of the Committee on Information of the Division of Medical Sciences of the National Research Council. Cloth. Pp. 418 with 82 illustrations. Price, $5.00. New York: E. P. Dutton & Company, Inc., 1945.

The medical service of our armed forces is a large organization with many duties besides treating the sick and wounded. The contributors to this volume, most of them noted for achievements in special fields, show the extent and accomplishments of this service. The medical side of selective service is described by Col. Leonard G. Rowntree, chief of the Medical Division, Selective Service System. Dr. Harold S. Diehl, dean of the School of Medicine, University of Minnesota, tells how the physicians of America were allocated to meet the needs of civilian population as well as those of the armed forces. Maj. Gen. George F. Lull, Deputy Surgeon General of the Army, explains the manner in which the medical manpower of the nation was mobilized for this war. Maj. Gen. Norman T. Kirk, Surgeon General of the Army, gives an inspiring picture of the service rendered by physicians to our armed forces throughout the world. Brig. Gen. James Stevens Simmons, chief of the Preventive Medical Service of the Army, tells how the Army prevents war's epidemics, improves nutrition and inoculates against all sorts of infections. His account of preventive medicine in this war is a noteworthy record of medical progress. Brig. Gen. Fred W. Rankin, chief consulting surgeon of the Army, tells of the miracles wrought by surgery, the story of the treatment of shock and that of plastic surgery, blood transfusion and other factors that have yielded such magnificent results.

Maj. Gen. Paul R. Hawley, chief surgeon in the European theater of operations, gives an account of how the medical units in the European theater prepared for D-day. Vice-Admiral Ross T. McIntire, Surgeon General of the Navy, describes authoritatively the service rendered by the physicians of our Navy in the war. Capt. French R. Moore of the Navy Medical Corps, in his account of the battles for Guadalcanal and Tarawa tells dramatically the amazing exploits of the men who participated in these battles and shows why many of the physicians were decorated by our government for conspicuous bravery. Dr. Thomas Parran, Surgeon General of the United States Public Health Service, makes clear the quiet and efficient way in which our lives are protected by this governmental agency. Maj. Gen. David N. W. Grant, the Air Surgeon describes the medical mission in the Army Air Forces. Many experts believe that evacuation of the wounded by air accounts in large measure for the marvelous record that has been made in this war in saving the lives of the wounded. The flight surgeon, as General Grant points out, is a combination family physician, psychologist and father confessor. Col. Howard A. Rusk, chief of the Convalescent Training Division, Army Air Forces, writes on convalescence and rehabilitation. Through Colonel Rusk's program, now in effect throughout this country, wounded men and those broken down by the strain of combat have been prepared both mentally and physically to return to combat or to reenter productive civilian life. What medicine has to offer to the veterans is elucidated by Dr. Charles M. Griffith, medical director of the Veterans Administration. Dr. G. Canby Robinson, national director of the Red Cross Blood Donor Service, gives the history of this service. In no other activity of the war have so many individuals contributed personally. Dr. George B. Darling, vice-chairman of the Division of Medical Sciences, National Research Council, records the many ways in which medical scientists have contributed their knowledge for the protection of the lives and health of the men and women in the armed forces and of the nation in general.

This is an excellent book with outstanding illustrations. It is the finest on the subject and should be in the library of every physician and surgeon, especially while doctors are at war.

THE EXAMINATION OF REFLEXES. A SIMPLIFICATION. By *Robert Wartenberg*, M.D. Foreward by *Foster Kennedy*, M.D. Pp. 222. Price, $2.50. Chicago: The Year Book Publishers, Inc. 1945.

Testing of reflexes and their proper evaluation undoubtedly constitute the most important part of the neurologic examination. This testing is easy; it requires but little time and only a reflex hammer for equipment. The cooperation of the patient is not needed; neither can he substantially influence the results. However, in actual practice physicians are bewildered by the confusing and conflicting classification of reflexes and the staggering number of names and the maze of terms. The author points out that in the existing literature a single reflex may be named according to the site of its elicitation, the joint of which acts and the nerves involved, that many a reflex has been rediscovered and renamed several times and that many a phenomenon which is not at all reflective is sometimes designated as a reflex. Hence his laudable attempt to classify and unify the numerous reflexes on the basis of a few simple fundamental physiological tenets. The most important reflexes are considered principally under the name of the muscle, starting with the orbicularis oculi reflex and ending with the plan-

tar muscle reflex. An impressive illustration on the plantar reflex shows that it can be elicited from many different points and has been described by at least 20 authors under 20 different names. This in itself is the best proof that the author's original work of simplification has been badly needed. The numerous quotations from the literature makes this handy and practical monograph also a fascinating history of reflexes. It should be of definite service to all physicians interested in everyday neurologic examination.

CONVALESCENCE AND REHABILITATION. Proceedings of the Conference held under the auspices of the Committee of Public Health Relations of the New York Academy of Medicine, April 25 and 26, 1944. Pp. 223. Published by Committee on Public Health Relations, The New York Academy of Medicine, 2 East 103rd Street, New York, under a grant from the Josiah Macy, Jr. Foundation.

"The present-day idea of convalescent care is that of a creative dynamic force, applied to persons recovering from either acute diseases or operations, or from the exacerbations of chronic maladies—a force which brings into play all the resources of mind and body, of medicine and psychology, to offset the baneful somatic and mental effects of illness. It comprises play as well as rest; it invokes religious emotion and an appeal to reason; it calls for the exercise of mind as well as muscle; it furnishes comforts and stimulates purposeful effort; it provides dressings for surgical wounds and instills sound health habits; it aids the natural recuperative processes and develops social discipline; it expedites recovery and strengthens character." These introductory sentences by Dr. E. H. L. Corwin, Secretary of the Committee on Public Health Relations of the sponsoring academy aptly express the idea underlying the Conference. The full account of the papers and discussions is presented in the volume. It contains comprehensive presentations on behalf of the U. S. Navy, the U. S. Public Health Service, the U. S. Army, the office of Vocational Rehabilitation, the Veterans Administration and of the Army Air Forces; these occupied the first day of the Conference. The second day's program devoted to symposia on nutrition, community resources, retraining and motivation is also fully presented. This volume adds an important document to the steadily growing literature on convalescence and rehabilitation.

PRACTICAL METHODS IN BIOCHEMISTRY. By *Frederick C. Koch; Frank P. Hixon,* Distinguished Service Professor Emeritus of Biochemical Research, Armour & Co., Chicago, and *Martin E. Hanke,* Associate Professor of Biochemistry, University of Chicago. Fourth Edition (Revised). Cloth. Pp. 353. Price, $2.25. Baltimore: A William Wood Book, The Williams & Wilkins Company, 1943.

That this book has reached its fourth edition speaks for its popularity and usefulness as a laboratory manual. It is intended to present for medical students the more important qualitative and quantitative chemical aspects of cell constituents, of cell activities and of the composition of blood, secretions and excretions. An interesting and invaluable feature is the detailed instruction for the preparation of solutions and reagents. Although the manual is intended primarily as the practical companion to Professor A. P. Mathews' textbook, nevertheless it contains considerable explanatory matter in order to help correlate the theoretical and laboratory aspects of the subject matter. The subject matter is divided into three parts. Part I, the chemistry of cell constituents covers the carbohydrates, lipins, proteins and amino acids, nucleoproteins and nucleic acids and hydrogen activity and pH. Part II, takes up the digestive tract. Part III, the most extensive treats of blood and urine. It is pointed out that the revised fourth edition adds four important features. In the chapter on proteins there have been incorporated the simpler quantitative methods for a number of amino acids. The chapter on hydrogen ion concentration has been considerably extended to include the treatment of the fundamental concepts of hydrogen ion activity, ionic strength. Better methods for the colorimetric estimation of amino nitrogen and cholesterol have been introduced in the chapter on blood analysis. Chapters on the colorimetric estimation of vitamins and color reactions of hormones have been added.

The value of this manual cannot be overstated and it is surely recommended as an essential part of the library of every physician.

INTERNS HANDBOOK. A GUIDE, ESPECIALLY IN EMERGENCIES, FOR THE INTERN AND THE PHYSICIAN IN GENERAL PRACTICE. By Members of the Faculty of the College of Medicine, Syracuse University. Under the direction of *M. S. Dooley,* A.B., M.D., Professor Pharmacology, and *Maynard E. Holmes,* M.D., F.A.C.P., Professor of Clinical Medicine. Fabricoid. Price, $3.00. Pp. 579. Third Edition. Philadelphia: J. B. Lippincott Company, 1944.

Revisions and new material of note in this new edition are the sections dealing with Chemotherapy, Endocrine Disturbances, Vitamins, Pulmonary Emboli and Blast Injuries. There is a wealth of valuable information for the intern or physician in this pocket size book. The first section deals with orientation of the intern in relation to the hospital and public and medical legal requirements. Part two deals with the common routine laboratory procedures with description of technics for performing some of the simpler examinations and collection of material for distribution to laboratories for the more complicated procedures. Part three deals with general medical conditions beginning with an outline for history and physical examination and then special information in re- and emergency treatment. Cardiovascular emergencies are also discussed in some detail and other medical emergencies such as coma and acute abdominal conditions. Special information is inlation to chest conditions, their symptomology

cluded in regard to diagnostic procedures in relation to allergy, endocrine disturbances and endocrine therapy. Under neurology, symptomology of cerebral hemorrhage is described, technic of lumbar puncture and information in relation to meningitis and brain abscess. There is also a brief description of the care of disturbed or delirious patients and methods of forced feeding and medication. Another section is devoted to infectious diseases and procedure of examination and history taking in pediatrics. Under the heading of metabolic disturbances, thyroid disorders and diabetic coma are discussed as well as the upset of chemical equilibrium in uremia. A final section under medicine deals with common skin diseases and their treatment. The fourth part of the book is concerned with surgery, including pre- and postoperative care, rudiments of anesthesia and examination in relation to gynecology, obstetrics, ophthalmology, otolaryngology, proctology and urology. The concluding section is on therapy, including diet, vitamins, solutions and drugs and emergency treatment of acute poisoning and resuscitation.

This small book is highly recommended for the up to date valuable information contained within it. One significant omission is the failure to mention Physical Therapy and give instruction on indications and correct methods of prescription.

THE SAFE INSTALLATION AND USE OF ABRASIVE WHEELS. By *International Labor Office*. Paper. Pp. 175, illustrated. Price, $1.00. Montreal and Washington, D. C., International Labor Office, 1944.

The present volume is the ninth in a series of monographs on problems of prevention of industrial accidents. Much of the work was done by Mr. G. Stephenson Taylor, Deputy Inspector of Factories, London. The legislative part of the volume contains the American Standard Safety Code for the Use, Care and Protection of Abrasive Wheels thus making available to readers the latest data produced in the field in the United States.

CLINICAL CASE-TAKING. GUIDES FOR THE STUDY OF PATIENTS. History-Taking and Physical Examination or Semiology of Disease in the Various Systems. By *George R. Herrmann*, M.D., Ph. D., Professor Medicine, University of Texas. Price, $1.75. Pp. 192. St. Louis: The C. V. Mosby Company, 1945.

This is a compact pocket manual to instruct medical students and hospital interns in the proper methods of history taking and physical examination of patients. The table of contents has been so set up that it can be memorized by the student as an outline to be followed in each case. The individual chapters go into great detail in describing technic of questioning patients and the proper use of medical and lay terms with a completeness not usually available to the student. Special sections are devoted to the symptomology of certain types of cases, such as endocrine, metabolic disorders and blood diseases, allergic conditions, nutritional diseases, diseases of the lung, peripheral vascular disorders, diseases of the digestive tract, genitourinary tract and also mental and nervous diseases.

In the appendix are included details of common symptoms with list of diseases for differential diagnosis. This book is much more than the usual history outline, it is a small textbook containing valuable information to aid the physician in learning the art of medical practice and a guide to the development of skill in developing diagnostic acumen. Wide usage should be of great benefit in medical education.

MODERN METHODS OF AMPUTATION. By *Edmundo Vasconcelos*, Professor, University of Sao Paulo. With an Introductory Survey of The Development of Amputation by Major General *Norman T. Kirk*, M.C., Surgeon General, U. S. Army. Cloth. Pp. 253, with 262 illustrations. Price, $10. New York: Philosophical Library, Incorporated, 1945.

This interesting textbook on amputations has been prepared by the author "to realize as well as to offer a selection of techniques for amputation of the limbs, by gathering together such techniques as have won recognition through practice and long experience." The author states that this book "consists of the official report submitted by the author at the Third Brazilian and American Surgical Congress which met in Rio de Janeiro, November, 1941."

The book begins with an introductory survey on the development of amputations by a well-known authority on this subject, Maj. Gen. Norman T. Kirk, Surgeon General of the U. S. Army. General Kirk states that this section has been concerned mainly with the sketching of the gradual evolution of the art of amputation from earliest times to a period ending some years after the last war.

There follow chapters on generalities, surgical technic, indications, technic for amputations of the upper extremity, technic for amputations of the lower extremity and on prostheses and apparatus. An outstanding feature of the textbook is the splendid collection of detailed and anatomically correct drawings which are supplied in sufficient numbers to make the various steps in the surgical procedures quite clear. Although the book deals largely with surgical technic, certain statements in the author's introduction bear repetition. The author has written, "It is to be remembered that the function of the surgeon does not cease with the completion of the surgical act, it continues in regard to the selection of the prosthesis and the patient's rehabilitation for future work, and these things are indispensable acts consequent to the surgical operation." He adds, "The surgeon and the limb-maker must work in harmony, and not independently of each other, as has been the case in the past."

Unfortunately, although the author does include a chapter on prostheses, he does not elaborate on the very important subject of training in use

of the prosthesis and the patient's rehabilitation for future work because he believes that "there are people and institutions, specialized along these lines, of recognized efficiency." Since he recognizes the importance of fitting of the prosthesis and rehabilitation of the patient for future work, it is to be regretted that he has not devoted more attention to these subjects in his text. The author makes the usual mistake of most surgeons which is to describe the surgical technic in great detail and then to pay only lip service to the very important problems of fitting of the prosthesis and rehabilitation of the patient. Despite this one shortcoming, the textbook can be highly recommended. It is an outstanding contribution on the surgical technic of amputations. It should be read by all surgeons and orthopedists, especially those in military service. Because of the tremendous increase in the number of amputations as a result of the war, this is timely presentation.

CRIME AND THE HUMAN MIND. By *David Abrahamsen,* M.D., Department of Psychiatry, Columbia University. Pp. 244. Cloth. Price, $3.00. New York: Morningside Heights: Columbia University Press, 1945.

This book offers information regarding the factors in crime from a psychiatric-psychologic viewpoint. The material has been presented in an interesting way by one who has had a wealth of experience and who is well qualified to write on this subject, for he is the author of a long list of publications in various languages, dealing with science and its future, mass-psychosis, the psychiatric-psychologic background of murder, the dynamic connection between crime and personality, the function of language and its development. He was born in Norway and studied at Oslo, Copenhagen, and London, and in 1938 became psychiatrist with the Department of Justice at Oslo. During the German invasion of Norway, Doctor Abrahamsen was in the midst of the fighting. He established a field hospital and stayed until the end of organized resistance, when he was able to get out of the country by sheer good luck. Since his arrival in the United States in 1940, he has worked as a psychiatrist at the St. Elizabeth Hospital in Washington, D. C., and the Illinois State Penitentiary and as lecturer in psychiatric criminology at the Psychiatric Institute, Columbia University. He has also served as a psychiatrist at the Menninger Clinic, at Bellevue Hospital and at the Psychiatric Clinic of the Court of General Sessions. He is now a Research Associate of the Department of Psychiatry, Columbia University. After a brief review of the history of criminology, Abrahamsen presents his view of the criminal's mind, buttressed with numerous case histories; he analyzes the relative importance of heredity and environment as causes of crime, gives detailed instructions for the psychiatric examination of criminals, and suggests a system for the classification of individual offenders. Special chapters are devoted to juvenile and war delinquency, to the psychiatric background of murder, to relations between criminal law and the psychiatrist, and to treatment of the criminal. The author emphasizes repeatedly that the obvious motives for crime are seldom the actual ones and that criminal acts must be regarded largely as symptoms of personality difficulties. Many problems are discussed in these pages in a manner that should give those members of the medical profession who have not specialized in this field a better understanding of the problems confronting the psychiatrists and the judges of courts as well as those involving the unfortunate victims of circumstances that make for a criminal maladjustment. The appearance of this book adds another one to the long list of publications by European scholars who have found a haven in the United States in recent years. By actively contributing to the advances of medical and other science of their adopted country they help to increase its world-wide spiritual and intellectual leadership.

CONSTITUTION AND DISEASE. Applied Constitutional Pathology. By *Julius Bauer,* M.D., Professor of Clinical Medicine, College of Medical Evangelists, Los Angeles; Senior Attending Physician, Los Angeles County General Hospital, Consultant in Medicine, Cedars of Lebanon Hospital, Los Angeles; formerly Professor of Medicine, University of Vienna. Second Edition, Revised and Enlarged. Pp. 247. Price, $4.00. New York: Grune & Stratton, 1945.

The conception of a constitutional pathology has until recently been completely neglected in the United States, chiefly because its modern medical schools developed at a period when exogenous factors, like infection received almost exclusive consideration in the attempts of solving biological problems. In Central Europe the tradition of endogenous constitutional factors lived in many of the older physicians and scientists who were convinced that all available laboratory studies, invaluable as they might be, can never replace the impression gained from an intelligent observation of the patient himself. The author of this volume has taught constitutional pathology to physicians in the days when Vienna was still a popular postgraduate medical center. Now as a resident of the United States he presents from his vantage of medical scholarship and lifelong clinical observation his evaluation of the relative roles of heredity in the life of the individual in health and disease. The titles of successive chapters are: Constitutional pathology and its general significance, constitutional biologic inferiority of organs and tissues, the integrative systems of individual constitution, classification of normal and abnormal constitution, some major diseases with chiefly constitutional etiology, principles of treatment, nonspecific therapy, pitfalls and errors. Particular stress is laid on the bearing of the constitutional standpoint in the special field of endocrinology, as regards both diagnosis and therapy. Thus the study of this volume brings on a new aspect in the study and analysis of such everyday problems as obesity, high blood pressure, teen age overweight, pregnancy, menopause, diabetes, peptic ulcer, cancer. It is a valuable contribution to American medical literature. Con-

stitutional thinking at the patient's bedside as offered in this volume should greatly add to the clinical judgment and medical common sense of every practicing physician.

TRAUMA IN INTERNAL DISEASES WITH CONSIDERATION OF EXPERIMENTAL PATHOLOGY AND MEDICOLEGAL ASPECTS. By *Rudolf A. Stern,* M.D., Assistant Attending Physician, City Hospital, New York City. Foreword by *Francis Carter Wood,* M.D., Director of Laboratories and Radiotherapy Department, St. Luke's Hospital, New York. Pp. 575. Price, $6.75. New York: Grune & Stratton, 1945.

This is a scholarly and at the same time practical study of a large subject on which there is much controversy. The role of trauma in internal diseases is difficult to judge and only a comprehensive knowledge of the experimental and clinical scientific literature will enable a medical witness to render sound testimony. A brief introduction deals with the general facts concerning the importance of trauma in the etiology of internal diseases; the successive chapters discuss infectious diseases, diseases of the heart, arterial diseases, diseases of the veins, essential hypertension, traumatic aggravation of circulatory diseases, diseases of the lungs, the pleura, the esophagus, the stomach and duodenum, the intestines, appendicitis, diseases of the peritoneum, the liver, the gall bladder and bile ducts, the pancreas, kidney diseases, malignant neoplasms of internal organs, diseases of the metabolism, the endocrine glands and diseases of the blood and of the lymphatic system. Throughout this presentation are dispersed a series of critical case histories, with many exhaustive postmortem findings; there is also description of experimental work which either confirmed or refuted the assumption of trauma as an etiologic factor. These examples should enable the reader to form his own judgment through study and comparison of his own material with the citations of the book. Stern's volume should be highly welcome by those whose work deals with accident cases coming into the courts and by all medical men who wish to study the effects of trauma on their patients. It represents the first American study of substantial scope in a field which within a forseeable future will make heavier demands of the physician's knowledge than ever before.

THE MARCH OF MEDICINE. The New York Academy of Medicine Lectures to the Laity, 1944. Pp. 121. Price, $1.75. New York: Morningside Heights, Columbia University Press, 1945.

This volume is the sixth of the series of the published lectures of the annual Lectures to the Laity. The objective of these lectures has been to present to the laity the philosophical background of the healing art, the historical perspective of public health, and an effort to keep the public informed of recent medical discoveries with an insight into the trends of medical research. The present year's lectures are entitled "War and the Expanding Frontiers of Medicine." It runs the gamut from "morale and propaganda," which ordinarily precede and accompany wars, to "wars and epidemics." Dr. E. A. Strecker speaks on a better understanding of the potential and dynamic forces in the mass mind which influence the structure of society, and shows us the methods by which mass movements could be directed toward a better world. Food also comes under the aegis of propaganda, and certainly a better civilization is more and more dependent on better food supply. Doctor King in the second lecture: "Food and Civilization" points out concisely the goal towards which we are striving from a nutritional standpoint. Colin M. MacLeod gives an inspirational vision of the possibilities of conquering disease through chemotherapy starting with the story of salvarsan, and continuing on through the sulfa drugs to penicillin. Reginald Fitz renders a brilliant exposition based on historical perspective with a clear insight into the adjustment of health agencies to the new social order. The fifth lecture by Sir Gerald Campbell answers the question what effect the scientific approach exerts upon human beings in the post-war era. The last lecture by Lt. Col. Thomas T. Mackie, Executive Officer of Tropical Medicine in the Army Medical Center, presents a timely warning of the possibilities of epidemic diseases engendered through the return to civil life of fighting men from the far corners of the global conflict. The sixth volume of The March of Medicine is indeed a medical treat for the non-medical reader and reflects the impact of war and rapid and violent social change on medical science in an informative and interesting manner.

INTRODUCTION TO PHYSIOLOGICAL AND PATHOLOGICAL CHEMISTRY. By *L. Earl Arnow,* Ph.G., B.S., Ph.D., M.B., M.D., Director of Biochemistry Research, Medical Research Division, Sharp and Dohme; Professor of Chemistry, Brynmawr College Summer School of Nursing; Formerly Assistant Professor of Physiological Chemistry, University of Minnesota Medical School; Director in Physiological Chemistry, School of Nursing, University of Minnesota. Second Edition. Price, $3.75. Cloth. Pp. 974. St. Louis: C. V. Mosby Co., 1943.

This volume is a nurses' textbook written by a physician. It coincides with the teaching outline of the League of Nursing Education and is adapted to courses of varying length. The study questions at the end of each chapter are a distinct help. The textual material is related to the medical field and evidently presupposes that the student has had courses in medical diseases. The book appears to be a very satisfactory text for use in schools of nursing.

The volume is divided into three sections; chemical science, physiologic and pathologic science, and laboratory chemistry. It is the reviewer's opinion that this text is an important contribution to the field of nursing education and can be safely recommended to faculties of nursing schools.

PHYSICAL MEDICINE ABSTRACTS

The Management and Treatment of Cranio-Cerebral Injuries. Loyal Davis.

Quart. Bull., Northwestern Univ. M. School 19: 15 (Spring Quart.) 1945.

The author had the opportunity of seeing at first hand the organization of the Red Army Medical Corps and the methods which they used to manage and surgically treat cranio-cerebral injuries. The essential principle, on which they based their reported excellent results, was the utilization of competent neurologic surgeons in hospitals, as far forward as the Evacuation Hospital is situated in the Unites States Army, completely equipped and staffed to perform definitive neurosurgical operations. There was no problem of fixed tables of organization and supply to surmount electrosurgical units, suction apparatus and x-ray equipment could be placed as close to the injured man as the tide of battle would permit.

Nursing care must be intensive, intelligent and enthusiastic. Sufficient help must be provided to turn the comatose patient frequently; to care properly for the skin; to see that he gets food and fluid; to prevent the extreme restlessness which is produced by a distended bladder or a wet bed; to control sedation carefully and last, to have the proper attitude toward the patient's injury so that he may be returned quickly to activity around the ward and his final rehabilitation be successfully and speedily accomplished.

Advance in the Prevention and Treatment of Poliomyelitis. James L. Wilson.

J. Michigan M. Soc. 44:70 (Jan.) 1945.

Recently in the various attempts to rationalize the Kenny treatment, belief has been expressed that there is no true paralysis and poliomyelitis but that the resulting weakness was as I would express it a "pseudo-paralysis," due to some mental inhibitions or "alienation" derived from opposing tender muscles. I should like to emphasize the fact that the only pathologic change that we know of that is permanent and that does not disappear after recovery from the acute stage of the disease is a loss of those anterior horn cells and we should tie to this and not be misled by physiologic sophistries.

There is now much evidence that the primary pathology is in the motor cells of the anterior horns and that in all the other changes are secondary. Experimental work in monkeys has been carried out which demonstrated that the virus first damaged the anterior horn cells and that the interstitial changes were secondary and did not occur in spite of inoculation with potent virus in sections of the brain or the cord where the large motor cells had been destroyed previously. Attempts to increase the blood supply to the great motor cells were based on a misconception of the pathogenesis and were futile.

The consideration given the Kenny system by the medical profession demonstrates a commendable open-mindedness that physicians would seriously consider the claims of a nurse completely untrained in medicine or in basic science and from the time she first came to our country most contentious, intolerant of difference of opinion, and filled with a belligerent attitude towards the medical profession. It illustrates what seems to be unfortunate lack of critical judgment in many physicians, a lack of knowledge of how to evaluate a therapeutic experiment, a lack of knowledge of the natural course of poliomyelitis and a reprehensible tendency, of which, however, physicians are not fully responsible, toward allowing premature publicity. It is hard to resist the fundamental American tendency to ride on the "band wagon," in medicine as in other fields.

Developments in Arthritis. Ralph Pemberton.

Am. J. M. Sc. 209:368 (March) 1945.

Effective therapy of arthritics require a regimen of "total support" of the patient. There are obviously two therapeutic aspects to total support; one, in general, removes from the field such accessible factors as make for or constitute worry, fatigue, faulty body mechanics, faulty nutrition and focal infection; the other seeks to provide constructive factors such as rest, correction of anemia, replacement therapy in the gastrointestinal or endocrine system; tonic medication, sedation, physical therapy and optimal nutrition.

Recognition of the operation of neuroendocrinous influences in the syndrome as a whole, and in a regimen of total support in particular, not only contributes to a rational concept of the nature of the disease but also serves to bring into better perspective a number of valuable therapeutic practices.

Reactions of Normal Young Men to Hot, Humid (Simulated Jungle) Environment. Ludwig W. Eichna; William Bennett Bean; William F. Ashe, and Norton Nelson.

Bull. John Hopkins Hosp. 76:25 (Jan.) 1945

The present global conflict requires men to live, work and fight in extremes of climate to which most of them have not been previously exposed. In some regions climate alone, apart from endemic diseases, has caused casualties and reduced the efficiency of personnel. The physiologic effects of hot environments has been one of the aspects of a long-term study designed to determine the effects of stresses likely to be encountered by military personnel. Observations on the responses of man to heat and his adjust-

ments to the increased thermal load are not new. Almost two centuries ago, military surgeons laid down rules governing health and activity in the tropics. Contemporary observations have assumed several forms. Lifelong inhabitants of hot climates and recently transplanted white men have been compared with inhabitants of temperate regions in regard to various physiologic functions. Small groups or single investigators, studying themselves, have examined the effects of passing from temperate into hot climates. The effects of heat on workers (many of them colored natives) in hot occupations have been described. Hot rooms or hot baths have been used to study the changes induced by abrupt alterations in environmental temperature.

Modified Treatment for Fracture of the Head of the Radius. R. W. Postlethwait.

Am. J. Surg. 67:80 (Jan.) 1945.

Fractures of the head of the radius which do not show marked displacement will recover more promptly and completely if treated by joint aspiration, procaine injection into the joint and immediate active motion. The aspiration of the hemarthrosis and the injection of procaine will produce relief of the severe pain which occurs soon after injury, and will permit earlier increase in the range of motion.

Trench Foot. Frank K. Boland; Thomas S. Claiborne, and Francis P. Parker.

Surg. 17:570 (April) 1945.

The treatment was simple. The patients were grouped for treatment purposes into mild, moderate and severe types. Those with a mild type were kept in bed three to fourteen days. The feet were slightly elevated if there was any pain. A modified type Buerger's exercise was begun when the pain and swelling had diminished. As soon as possible the patients with no signs were encouraged to walk, first without shoes and later with their regular shoes. When they were able to walk one-half mile and soak their feet alternately in hot and cold water without return of symptoms they were ready for discharge to duty or to a convalescent hospital, depending on the toughness of their feet.

Six of the patients whose pain was not relieved with ordinary cooling were improved by the use of ice bags. Two patients who were seen early were interesting. They had only slightly swollen feet but they complained of severe pain. When they were not relieved of their pain by ordinary cooling they were given buckets of ice water and allowed to cool their feet. They received immediate relief of the pain but after several treatments the feet became swollen and blue. This form of therapy was discontinued. For those with more intense pain and severe swelling dry cold is used in the form of protected ice bags and there has been no increase in the edema since the dry cold was used.

Effect of Prolonged Physical Inactivity on Tolerance of Sugar. Harry Blotner.

Arch. Int. Med. 75:44 (Jan.) 1945.

A study was made of the effect of prolonged physical inactivity on the dextrose tolerance of 86 nondiabetic patients, 70 adults and 16 children, who had been confined to bed for one month to thirteen years by various pathologic conditions. A comparison was made between the dextrose tolerance of these patients and that of active adults and children.

It was found in general that the sugar tolerance was diminished in the patients who had been confined to bed for considerable periods. The fasting blood sugar in these cases ranged from 70 to 130 mg. per hundred cubic centimeters, and the fasting urine was free from sugar. After the ingestion of dextrose the concentration of blood sugar rose to abnormal levels, the maximum being 364 mg., and varying amounts of sugar were found in the urine at various times. In many of the adults there was a high renal threshold for dextrose. In some patients who later became ambulatory for several months the sugar tolerance returned to normal. Age did not appear to have a definite relation to the diminished sugar tolerance. Hypertension, vascular disease, obesity and infection in themselves did not appear to be significant as causes.

Physiotherapy of Wounds. I. A. Piontocovsky.

Am. Rev. Sov. Med. 2:224 (Feb.) 1945.

The wound is irradiated with hypererythemic doses of ultraviolet irradiation immediately after primary dressing. Not only the surface of the wound but the surrounding tissues are exposed at a distance of 5 to 10 meters from the source. Such an irradiation may be repeated every four to five days. In case of wound infection and pocketing, it is advisable to subject it to ion transfer after primary dressing and repeat it at the next dressing.

Later, treatment may be applied by ultrahigh frequency current in small doses when a purulent inflammation develops. This acts as an irritant, activating the reticulo-endothelial system, locally and systemically. Exposures are made every other day. In severe inflammation, it is sometimes expedient to apply ultraviolet irradiation on a large skin surface. Such distal irradiation has a less irritating influence on the inflammatory process. The area to be irradiated measures about 400 to 500 sq. cm. Treatment may be repeated every three to four days. Fever is no contraindication to physical therapy.

Treatment aims to prevent the spread of infection and to accelerate granulation tissue formation. Physical therapeutic measures create in the wound favorable conditions which contribute to an optimum granulation formation.

It is necessary to stress that healing is not static, that it is a continuous dynamic process not separated by barriers. It is necessary to recognize a given stage of healing in order to apply physical therapy in a routine manner. The out-

ward appearance of the wound, the granulations, and the state of the epithelium, are the indications for the type of therapy.

Healing is not simply an isolated process but depends on the general state and reactions of the entire organism, which also must be supported. Physical therapy exerts a beneficial systemic effect and ultraviolet radiation is therefore of value in emaciation, malnutrition and alimentary disturbances. In anemia, diathermy of the long bones is indicated. To increase the tone of the nervous system, hydrotherapeutic measures and heliotherapy are valuable.

Portable Exercise Cart.

Bull. U. S. Army M. Dept. 86:36 (March) 1945.

The portable exercise cart is useful in building the physical stamina of patients in the class III and IV reconditioning program. The apparatus can easily be moved from one ward to another and still give nearly all the equipment of a small gymnasium. This is especially beneficial for patients who cannot do much walking and yet have energy for some other physical activity. Where lack of personnel is a problem, one or two men from the advanced reconditioning program can push the cart from ward to ward and set it up for use in five minutes.

The portable cart which can be easily constructed in the occupational therapy or post engineer shop is capable of providing exercise for forty-five to fifty men. The equipment consists of twelve 1-pound dumb-bells, twelve 2-pound Indian clubs, one 4-by-5-foot tumbling mat, one rowing machine, six hand grippers, three cable exercisers, twelve skipping ropes, two sets of wall pulleys, two medicine balls of 6- and 10-pound weight and one collapsible chinning bar.

Refrigeration Anesthesia in Surgical Procedures. Damon B. Pfeiffer, and F. M. Simmons Patterson.

Pennsylvania M. J. 48:352 (Jan.) 1942.

Refrigeration is the chilling, not the freezing, of tissues. Refrigeration anesthesia is indicated in aged, poor-risk diabetics with gangrene of an extremity that requires amputation. Nine limb amputations under ice in diabetics are reported with one death. In persons with gangrene of an extremity due to arteriosclerosis or peripheral vascular disease, and who are bad risks, refrigeration is the anesthetic of choice. Three successful cases are reported. The technic of limb amputations under ice is described, and the advantages of this procedure are listed. Refrigeration anesthesia is often a life-saving procedure when gangrene, infection, toxicity, and possibly septicemia exist. The patient may be thus improved to the point where conservative or radical surgery is rendered possible. Refrigeration of badly crushed extremities retards shock and bacterial growth and permits the patient to be improved generally by transfusions. Amputation with no further anesthetic agent may then be safely performed. Refrigeration offers many advantages in the treatment of burns. In fresh embolism and thrombosis, refrigeration of the limb extends the limits for successful embolectomy. It also gives marked symptomatic relief, and makes possible later radical surgery. Two successful cases are reported. Severe cases of frostbite often respond miraculously to the application of cold. The value of refrigeration has been extended to the field of skin grafting. Sixteen cases of limb amputations were performed under ice with only one death. All patients were exceedingly poor risks.

Artificial Respiration by Rib Traction. R. Viswanathan.

Lancet 6339:238 (Feb. 24) 1945.

If the patient is on a bed or on an operating table lying on his back, the operator stands at the head end and places the palms of the hands on the lower part of the chest, the middle fingers being on the anterior axillary lines. The fingers are hooked round the lower costal margins on both sides. The pull is made in an upward and outward direction, thereby raising the anterior portions of the ribs as well as widening the lower costal arches. After a steady pull for 3 seconds the pull is released and the chest is gently pressed downward and inward, while the extended fingers exercise the same pressure on the abdomen. To do this about 12 to 15 times a minute brings about a respiratory exchange of over 7,000 cc. of air. In addition, the expansion of the chest and outward stretching of the diaphragm, owing to the widening of the lower costal arches, helps the venous return of the blood.

Causalgia. I. Joshua Speigel, and Jack L. Milowsky.

J. A. M. A. 127:15 (Jan. 6) 1945.

In 1864 the term causalgia was coined by Mitchell, Morehouse and Keen, who stated: Its intensity varies from the most trivial burning to a state of torture which can hardly be credited but reacts on the whole economy until the general health is seriously affected. The part itself is not alone subject to an intense burning sensation but becomes exquisitely hyperesthetic, so that a touch or a tap of the finger increases the pain. Exposure to the air is avoided by the patient with a care which seems absurd, and most of the bad cases keep the hand constantly wet, finding relief in the moisture rather than in the coolness of the application. . . . He (the patient) walks carefully, carries the limb tenderly with the sound hand, is tremulous, nervous and has all expedients for lessening his pain.

The therapy of causalgia is aimed at one of three expedients—removal of the cause of irritation to the nerve, interruption of the afferent pathway in the peripheral nerve and finally interruption of the sympathetic supply of the extremity.

In an unselected series of 275 peripheral nerve injuries, 3 per cent presented the picture of causalgia. The syndrome followed injury to all or any of the major nerves of the upper extremity.

In spite of numerous lower extremity nerve injuries, only 1 case of lower limb causalgia occurred. Injury to a blood vessel frequently accompanies nerve injuries in causalgia but is not a necessary concomitant of nerve injury in the production of causalgia. The most constant symptom of causalgia is hot burning pain aggravated by movement and friction. The most constant findings are a shiny, cold, profusely perspiring and frequently cracked skin in the involved extremity with hyperesthesia occurring in most of the cases. X-ray evidence of decalcification of the involved extremity is frequently seen.

Interruption of the sympathetic pathway, temporarily by sympathetic block or permanently by surgical sympathectomy, is a highly dependable form of treatment for causalgia. In the upper extremity it is not necessary to remove the stellate ganglion for effective control of the pain.

Shovelers' Fracture. J. H. Annan.

Lancet 6337:176 (Feb. 10) 1945.

McKellar Hall has described 15 cases of fracture of the spinous processes of the cervical or dorsal vertebrae as clay-shovelers' fracture, and Watson-Jones remarks on its rarity in Britain. So long ago as during the building of the Kiel Canal, German surgeons were conversant with this occupational injury, which they termed schipper Krankheit. There are described 8 cases of fracture-displacement of part of the spinous process of one or more of the 6th or 7th cervical or 1st dorsal vertebra.

McKellar Hall recommends early excision. This seems to be unnecessary at an early stage, a view supported by the early study in Germany and by Watson-Jones. In all the present cases there has been little disability after a month's rest from heavy work. The patients have been treated with heat and rest, have progressed to graduated exercises, and at no time was there any indication for surgical removal of the fragment, which, in all probability, would cause more lasting weakness than the injury. The ultimate healing is only by fibrous union.

Parietal Neuralgia. R. H. McDonald.

Cleveland Clin. Quart. 12:28 (Jan.) 1945.

Parietal neuralgia is induced in the great majority of cases by some pathologic process or by pressure on the spinal nerve root, usually at the point where it emerges from the intervertebral foramen. The commonest cause in older patients is undoubtedly a hypertrophic atrophic process of gradual encroachment on the foramen. In younger patients the question of postural strains must be considered. Structural scolioses, injuries and tumors of the bone may be readily recognized, but functional scoliosis may escape notice. This will only be seen by careful examination of the patient's back and posture. Any complete physical examination must include careful observation of the patient's back, preferably with the patient standing in his bare feet.

Treatment of parietal neuralgia depends on the process which has caused it. In the arthritic patient the use of heat and massage over the affected area will be of value. Limitation of the movement of the spine by adequate braces may be useful, and roentgenotherapy to the spine has apparently been beneficial. Avoidance of prolonged walking and standing and a period of recumbency in a firm bed may be useful from a therapeutic viewpoint and also as an aid in diagnosis. In the case of younger persons, especially those of asthentic type, the use of graduated postural exercises is of chief importance. By their use muscular tone is improved and ligamentous strain is relieved. Marked improvement of peripheral circulation is frequently seen in association with deep breathing exercises, and an improved position and circulation with deep breathing exercises, and an improved position and circulation of the abdominal viscera often alleviates the indefinite gastrointestinal symptoms of which these patients complain. A short lower extremity may be corrected with a lift in the heel sufficient to cause the pelvis to be level and to restore the symmetry of the spine, thus overcoming the mechanical basis for strain. Adequate rest is also beneficial and may be all important in the chronically exhausted person.

Problem Cases in an Army Industrial Installation. Leo V. Schneider, and Clarence L. Clark.

Mil. Surgeon 96:89 (Jan.) 1945.

The United States Army, as the world's largest employer, is, of course, also confronted with the problem of keeping workers on the job. The New York Port of Embarkation is one of the Army's largest industrial organizations with hundreds of different job classifications and thousands of workers.

Physically handicapped workers could be placed judiciously and utilized in an industrial set-up provided that pre-employment examination is used properly as an instrument of placement.

An industrial medicine set-up must include physicians who are willing and capable of evaluating the complaints of the working individual. They must have an adequate psychosomatic orientation to be prepared to interpret these complaints with a view to achieving improved employee morale, better health standards which in turn will give greater human satisfaction and a maximum efficiency of production.

Refrigeration in Surgery. C. G. Johnston.

Am. J. M. Sc. 209:256 (Feb.) 1945.

The increased use of reduced temperature in surgery has renewed interest in the effects of temperatures other than those which are considered normal for mammalian tissues. The use of hot or cold applications in surgery is ancient in origin. Despite this fact, the effects of such applications have not been thoroughly understood. The efficacy of heat or cold as therapeutic agents, while recognized, was not well-enough defined to prevent controversy over the temperature which was most useful in any given case. Temperatures

low enough to cause freezing or high enough to cause burns were always recognized as pathologic. Therapeutic interest is concerned with the range of temperatures between these extremes. Attempts to affect the course of disease by changing the temperature of the entire body have yielded useful information regarding reactions to heat and cold regardless of the advantages which may have resulted so far as therapy is concerned.

Many new facts have been presented with regard to the effects of controlled low temperature, and the reaction of tissues to these temperatures. Clearer concepts regarding the benefit which may be expected from refrigeration are at hand.

Medical Conditions Simulating a Surgical Upper Abdomen. A. A. Conrad.

Nebraska M. J. 30:12 (Jan.) 1945.

Osteoarthritis, because of root irritation, with subsequent pain in the upper abdominal wall may simulate an intra-abdominal lesion. Carnett's method is that of having the patient tighten the muscles of the abdominal wall with forced rigidity of the muscles. With this defense, he claims, intra-abdominal conditions are not going to prove painful to palpation, but on the other hand if the abdominal muscles are relaxed, intra-abdominal conditions are going to cause tenderness and discomfort. If there is neuralgia, pinching of the skin and subcutaneous fat with considerable force, will cause rather severe discomfort, whereas if the condition is dependent on an intraperitoneal involvement the pain is minimal or absent.

Further Observations on One-Day Treatment of Syphilis With Fever and Mapharsen. Nathaniel Jones; Joseph L. Hundley; Allen E. Walker; Charles M. Carpenter; Stafford L. Warren, and Henry Hanson.

New York State J. Med. 45:279 (Feb. 1) 1945.

At 7:30 A. M. on the day of treatment, the patient is placed in a Rochester Radiant Energy Cabinet. The specific gravity of the blood plasma is used as a guide to insure a normal fluid balance during fever. The temperature is gradually elevated to 41.1 C. (106 F.) during a period of two hours and is maintained at that level for five hours. The rectal temperature is recorded continuously by means of a resistance thermometer and is also checked periodically with a clinical thermometer. At ten-minute intervals the pulse rate, respiratory rate, and temperature are recorded. During the fever the patient is given from 300 to 400 ml. of fluid per hour by mouth. Throughout the treatment the patient is under constant supervision of a nurse especially trained for this type of therapy.

At the termination of the five-hour fever, the cabinet is opened to permit defervescence, which usually requires about one hour. The patient is transferred to bed and the temperature is observed hourly until three normal readings (37 C. or 98.6 F.) have been recorded.

Continued observations on the original group of 280 patients as well as on 141 additional patients corroborate preliminary findings that the combined use of fever and mapharsen is effective in the treatment of early syphilis as well as in early latent syphilis.

A New Treatment for Flatfoot and Other Common Foot Disabilities. Otto Meyer.

Med. Rec. 157:733 (Dec.) 1944.

Years of experience in the treatment of flat feet have convinced the author that latent thrombophlebitis in the deep veins of the leg and of the plantar veins plays the deciding role in the causation of a painful flat foot.

The most effective therapy for these conditions is the pressure bandage. The patient should walk a great deal with the pressure bandages in order to intensify contraction of the leg and foot muscles. The pressure bandage produces an automassage during walking.

Usually the patient feels relief immediately after the application of the pressure bandages. The bandages have to be changed twice a week, as they become loose as a result of decrease of inflammatory swelling. The treatment has to be continued until the deep veins can be palpated without pain.

Obvious focal infections (pulpless teeth, infected tonsils) must be removed as they "feed" latent infections in the veins.

Indications for Shock Therapy in Mental Illness. Lorne D. Proctor.

Canad. M. A. J. 53:136 (Feb.) 1945.

The chief contraindication to insulin and electroschock therapy is a previously damaged cardiovascular system or an active infection.

In schizophrenia, insulin shock therapy is the therapy of choice and convulsant shock should only be considered if the patient shows catatonia so that he presents an acute problem of nursing and is completely inaccessible for psychotherapy. Electroshock therapy is indicated occasionally in the psychoneurotic group.

Rocker for Artificial Respiration. C. W. Hope-Gill.

Corres. Brit. M. J. 4373-565 (Oct.) 1944.

I have been so much struck by the efficiency and simplicity of design of a device for the carrying out of the rocking method of artificial respiration that I feel it deserves further publicity.

The rocker is provided with six pegs spaced so as to engage with the mesh of a C. D. stretcher. The pegs are of three-fourths inch dowelling and project one and one-half inches above the rocker. The centers of the outside pegs are at corners of a rectangle seventeen and one-fourth inches by six and one-half inches. At each end of the head of the trestle one-fourth inch iron plates are attached to form cups which hold the rocker securely when the trestle is erected.

In use the patient is firmly fastened to a stretcher while artificial respiration by Schafer's method is applied. Meanwhile the trestle and rocker are erected, the rocker being placed in a horizontal position. The stretcher is then lifted and placed on the rocker.